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1921

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**Manual
of
Hancock
Locomotive
Inspirators**



Manual
of
Hancock Locomotive
Inspirators

7th Edition

TRADE **THE HANCOCK** MARK

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The Hancock Inspirator Co. Sales Dept.
of
Manning, Maxwell & Moore, Inc.

General Offices:
119 West 40th Street
New York

Factory: Boston, Mass.



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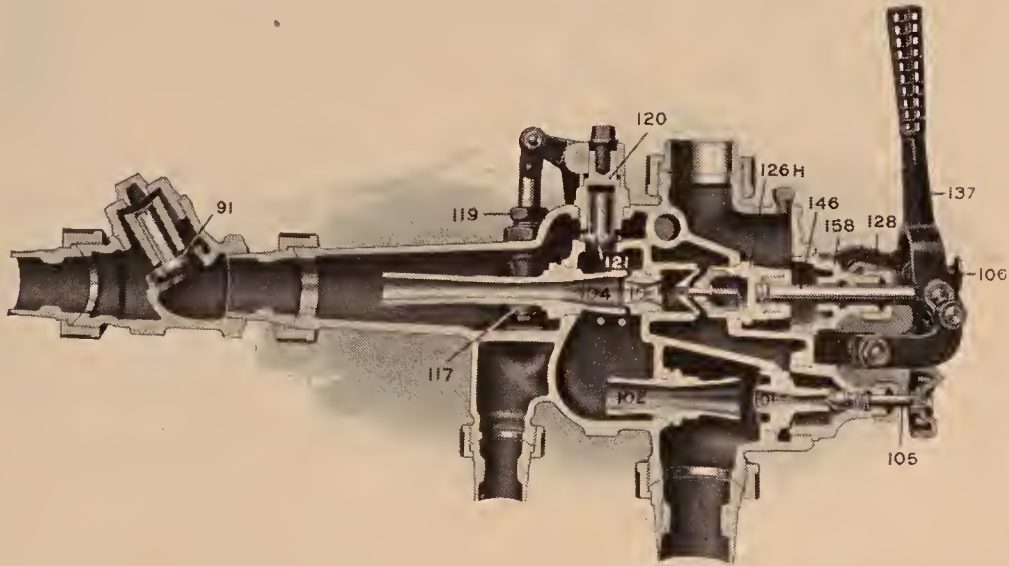
Introduction

This manual has been compiled for the purpose of placing in the hands of the men who operate and those who make repairs to Inspirators such information as will enable them to fully understand the operation of the apparatus and aid them in making repairs when necessary. We have endeavored to enumerate all the possible causes of Inspirator failures and to point out the proper method of locating the trouble and its remedy. In the matter of repairing Inspirators the manual will be found to contain all the information needed by the repairman to enable him to appreciate all of the vital points involved and to proceed intelligently and expeditiously to restore the Inspirator to its original efficiency, in the shortest time possible and with the least amount of new material.

We are constantly aiming to improve our apparatus by simplifying the operation, maintaining its efficiency as a boiler feeder and reducing the cost of maintenance to a minimum.

THE HANCOCK INSPIRATOR

The Hancock Locomotive Inspirator is a double tube apparatus working with a positively closed final overflow valve. The Inspirator consists of one apparatus for lifting or priming and another for forcing, each having its own steam nozzle and combining tube, so arranged that the lifter delivers the water to the forcer under pressure. This feature may be clearly seen by an inspection of the cut inserted herein.



The fundamental advantage of this construction, obtained with no other design, exists in the automatic regulation or governing of the water supply. Both steam nozzles receive approximately the same steam pressure when the Inspirator is working, the lifter tube raising the water and delivering it under pressure into the intermediate chamber; the forcer tube receives this water and delivers it into the boiler. If the steam pressure rises, the lifter tube will lift and deliver more water to the forcer, but inasmuch as there is a correspondingly greater amount of steam passing through the forcer nozzle, proper care is taken of this increased supply of water.

As a result, the Hancock Inspirator has an extraordinary range of steam pressure, working equally well at 35 or 350 pounds pressure without any adjustment whatever.

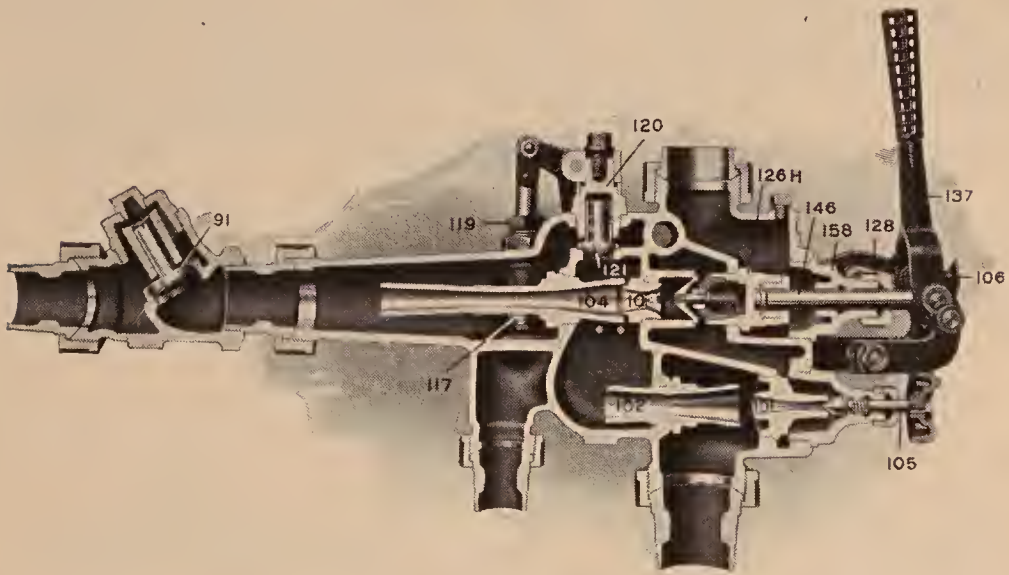
In addition to this advantage, the receiving of water by the forcer side under pressure makes the Inspirator much less susceptible to "breaking" under severe conditions, such as high suction temperatures or excessive back pressures.

The positively closed final overflow, of course, makes it impossible for any water to “spill” or be lost while in operation, thus insuring the delivery of all the water into the boiler. As the overflow nozzle is coupled to the overflow pipe, escapement of steam in the cab is avoided.

In principle, the lifting and non-lifting Inspirators are precisely the same, the latter, however, is so designed that it works to best advantage when taking water under a head.

OPERATION OF THE HANCOCK INSPIRATOR

Lifting Type



To start the Inspirator, pull back the lever No. 137 into the first or lifting position, i. e., until the resistance of the forcer steam valve is felt. This will draw the steam valve 126-H from the main seat and admit steam through the steam valve No. 126-H to the lifter nozzle No. 101, at the same time holding the movable end of steam valve No. 126-H tighter to its seat. The discharge of steam from this nozzle into the lifter combining tube No. 102 entrains the air in the suction pipe, producing sufficient vacuum to lift the water. The flow of water passes through both the intermediate overflow valve No. 121 and the forcer combining tube No. 104 and out of the final overflow valve No. 117. A further movement of the lever draws the movable end of steam valve No. 126-H from its seat and admits steam to the forcer nozzle No. 103 and forcer tube No. 104, while at the same time the final overflow valve No. 117 is approaching its seat, creating sufficient pressure in the delivery chamber to close the intermediate overflow valve No. 121. The final overflow valve No. 117, will be closed and the Inspirator in full operation when the lever is drawn back to the stop.

Previous to January 1, 1921 the forcer steam valves for Hancock Inspirators were furnished with a lifter steam valve No. 130 or 130A. With this type of steam valve the drawing of the lever No. 137 to the lifting position moved the lifter valve No. 130 or 130A from its seat, admitting steam to the lifter steam nozzle No. 101, and pulling the lever back to the stop, drew the piston end of the old style forcer steam valve No. 126 or 126A from its seat.

The intermediate overflow valve operates automatically and its function is to afford relief to the lifting portion of the apparatus when priming.

REGULATION

The regulation of the capacity of the Hancock Inspirator is accomplished by means of the regulating valve No. 105, which controls the amount of steam admitted to the lifting nozzle of the apparatus.

When the pin in the wheel of the regulating valve is at the top, the Inspirator will deliver its maximum quantity of water; to reduce the feed, turn the regulating wheel to the right.

HEATING

To use as a heater, lift heater rod No. 106 until disengaged from the stud in the lever No. 137 and draw it back until the final overflow valve No. 117 is closed. Draw lever No. 137 to the lifting position and regulate the amount of steam going back by means of the regulating valve No. 105.

If desired, the operating lever No. 137 may be pulled back to its limit of travel, thus closing the final overflow valve; and the amount of steam necessary for heating be adjusted at the throttle on the fountain.

POSSIBLE CAUSES OF INSPIRATOR FAILURES

Lifting Type

Be sure that the Inspirator is receiving a sufficient supply of water, that is that the suction pipe is of the size recommended in this manual, that the tank valve is of sufficient area and that there are no leaks in the suction or syphon pipes. Before looking for trouble in the Inspirator itself, be sure there is no accumulation of lime in the branch pipe, boiler check or check shank to the boiler or in the overflow pipe and in case the overflow is piped into the ash pan that the end is not embedded in the ashes.

When the Inspirator refuses to lift or prime, after putting the lever in the lifting position, with the steam connections fully open and sufficient pressure in the boiler to operate the Inspirator, the trouble may be due to one or more of the following causes:

A leaky suction, an obstructed tank valve, hose, hose strainer, suction or overflow pipe, a poor joint between piston end of forcer steam valve and steam entrance port, a displaced lifter steam nozzle No. 101 or lifter tube No. 102 or a stuck intermediate overflow valve No. 121 that will not lift.

To Test for Leaks in the Suction

Close the overflow valve No. 117 and blow steam back into the tank; meanwhile swaying the hose and pipe and examining all connections between the tank and the Inspirator. A leak will be indicated by an issue of steam and should be stopped immediately upon its discovery.

Where a syphon device is used in a tank, care should be taken to see that no air leaks exist, due to loose pipe threads or corrosion. When loose feed pipes are found they should be fastened with substantial brackets that will prevent their swaying or vibrating.

To Test for an Obstruction in the Overflow Pipe

Disconnect the pipe from the Inspirator and examine the overflow nozzle No. 108, making sure that it is clear. While the overflow pipe is disconnected, try the Inspirator for lifting or priming and if the Inspirator works with the overflow pipe disconnected but refuses to work when it is connected the pipe is obstructed and must be cleared.

To Test for a Leak between Piston End of the Forcer Steam Valve and the Body Seat

Close the regulating valve No. 105 and pull the lever No. 137 into the priming position. If the piston end of the Forcer Steam Valve seats properly, no steam will be seen issuing from the overflow pipe.

To Determine Whether or Not the Lifter Steam Nozzle No. 101 or the Lifter Tube No. 102 has Become Displaced

Disconnect the suction pipe from the Inspirator, insert the hand into the suction opening and feel if the nozzle and tube are in position.

To Examine Intermediate Overflow No. 121

If, after making these tests, no cause for trouble has been found, examine the intermediate overflow valve No. 121 and make sure that it is free to lift. If it be so, the Inspirator should readily lift or prime.

To Test for an Obstruction in the Tank Valve, Hose or Strainer

With the tank about one-third full, start a leak by unscrewing the hose coupling nut, or, when a strainer is in the line, by loosening the cover until a stream about the size of a lead pencil flows therefrom. If the leak does not diminish upon starting the Inspirator it may safely be assumed that the waterway is clear to that point. On the other hand, if the leak ceases when the Inspirator is started it will be a positive indication that the waterway is obstructed and a thorough examination of the tank valve should be made to see that it is free from debris, such as coal, dead leaves, waste or mud and that it has an opening of sufficient area. In some forms of tank valves, while the original opening may have been ample, after continual use for some length of time the joints in the lifting mechanism may become worn to such an extent that the opening of the tank valve may be reduced so as to partially cut off the water supply from the hose. If such is the case it should be restored to its original condition. An examination of the hose should be made to make sure that the lining has not become loose. See that the combined area of the openings in the perforated plate of the strainer is at least double the area of the suction pipe, also that any gaskets used in the suction line are of full sized opening. The above should also be the procedure if the capacity of the apparatus is impaired.

If Inspirator Lifts But Will Not Force

When the Inspirator refuses to force water into the boiler after lifting it, the trouble may be due to one or more of the following causes:

An insufficient supply of steam, excessive resistance in the delivery pipe, worn out tubes, an improper relation between the opening of the forcer steam valve No. 126A or H and the closing of the final overflow valve No. 117, the intermediate overflow valve No. 121 being stuck open or a leak between this valve and its seat or between the removable seat and the body.

To Determine Whether or Not the Supply of Steam is Inadequate

Attach a steam gauge to the Inspirator at the oil plug. When the Inspirator is at work the reduction in steam pressure should not exceed five pounds and if a greater drop is observed the connections in the steam line should be sufficiently enlarged.

To Determine Whether or Not the Resistance in the Delivery Pipe is Excessive

Attach a pressure gauge to the delivery pipe near the Inspirator and observe the pressure indicated when the Inspirator breaks. When in a normal working condition, the Inspirator is capable of forcing water against a pressure about fifty per cent. above that of the steam supplied to it, although in practice the delivery should not exceed the steam pressure by more than ten per cent. If it is found upon trying to put the Inspirator to work that the delivery pressure exceeds that of the steam pressure, twenty or thirty per cent., the area of the openings through the delivery pipe and check valves should be increased until the excessive resistance is removed; be sure the delivery pipe is of the size recommended in this manual for the Inspirator being used, that the line check and boiler check valves have sufficient area and lift and that there is no lime formation in the delivery pipe or in the check shank to the boiler. If, however, the pressure in the delivery pipe is less than the steam pressure, it may be assumed that either the steam supply is restricted or the forcer tube No. 104 is worn out and should be replaced.

Improper Relation Between Final Overflow Valve No. 117 and Compound Forcer Steam Valve No. 126A or H

It is necessary for the successful operation of the Inspirator that the proper relation be maintained between the opening of the forcer steam valve No. 126A or H and the closing of the final overflow valve No. 117, so that sufficient steam to force the water into the boiler will be admitted to

the forcer steam nozzle No. 103 before the overflow valve No. 117 is closed. (To determine the above relation, see page 17.)

Too much lost motion in the connections between the lever No. 137 and the final overflow valve should not be permitted to accumulate, for it will disturb the relation between the forcer steam valve and the overflow valve which has been previously referred to. Temporary relief may be secured by screwing down the final overflow packing nut No. 118 to produce more friction on the stem of the overflow valve and prevent it from being suddenly slammed to its seat when near the point of closing. The proper course to pursue would be to have the Inspirator removed and repaired so that the lost motion would no longer exist.

Intermediate Overflow Valve No. 121 Stuck Open or Leaking

If the foregoing tests do not result in the disclosure of the trouble and it is found that the Inspirator still refuses to force water into the boiler, an examination of the intermediate overflow valve No. 121 should be made to see that it does not stick open or that there is no leak between this valve and its seat or between the removable seat and the body. If the Inspirator goes to work, but gradually becomes weaker and finally breaks, it may safely be assumed that the intermediate overflow valve leaks.

If there is a leak of steam at the overflow when the Inspirator is shut off it may be due to one or more of the following causes. A leaky lifter steam valve No. 130 if old design forcer steam valve is used, or a leaky forcer steam valve 126A or H, or a leak between the removable seat ring and the body.

If there is a leak of steam and water at the overflow the main steam valve on the fountain should be closed. If the leak continues it will indicate a leaky boiler check valve.

If water leaks from the overflow when the Inspirator is at work the final overflow valve No. 117 should be reground and, if necessary, the removable seat made tight on its seat in the body.

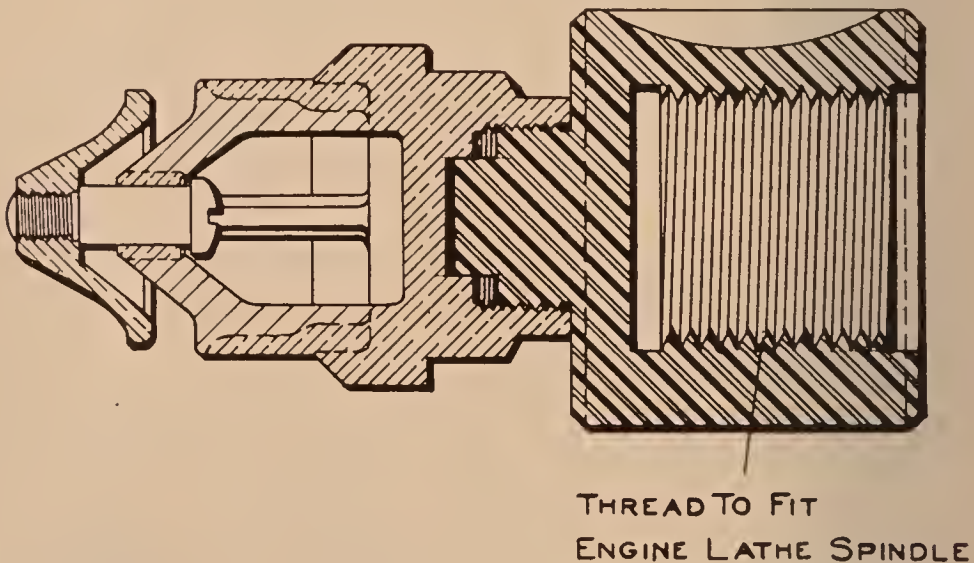
After any or all of the possible causes of trouble have been investigated and remedied the Inspirator should take water from the tank and continue to work until air begins to enter the suction when, of course, the Inspirator will break.

INSTRUCTIONS FOR REPAIRING THE LIFTING INSPIRATOR

Remove from the body all of the external and internal parts and by a careful examination of them determine which, if any, are so much worn as to require replacement with new parts. Bear in mind the fact that the elimination of all lost motion in the connections between the lever No. 137 and the final overflow valve No. 117 is fully as essential to the successful operation of the Inspirator as a perfect condition of the tubes and nozzles.

Applying a New Forcer Steam Valve

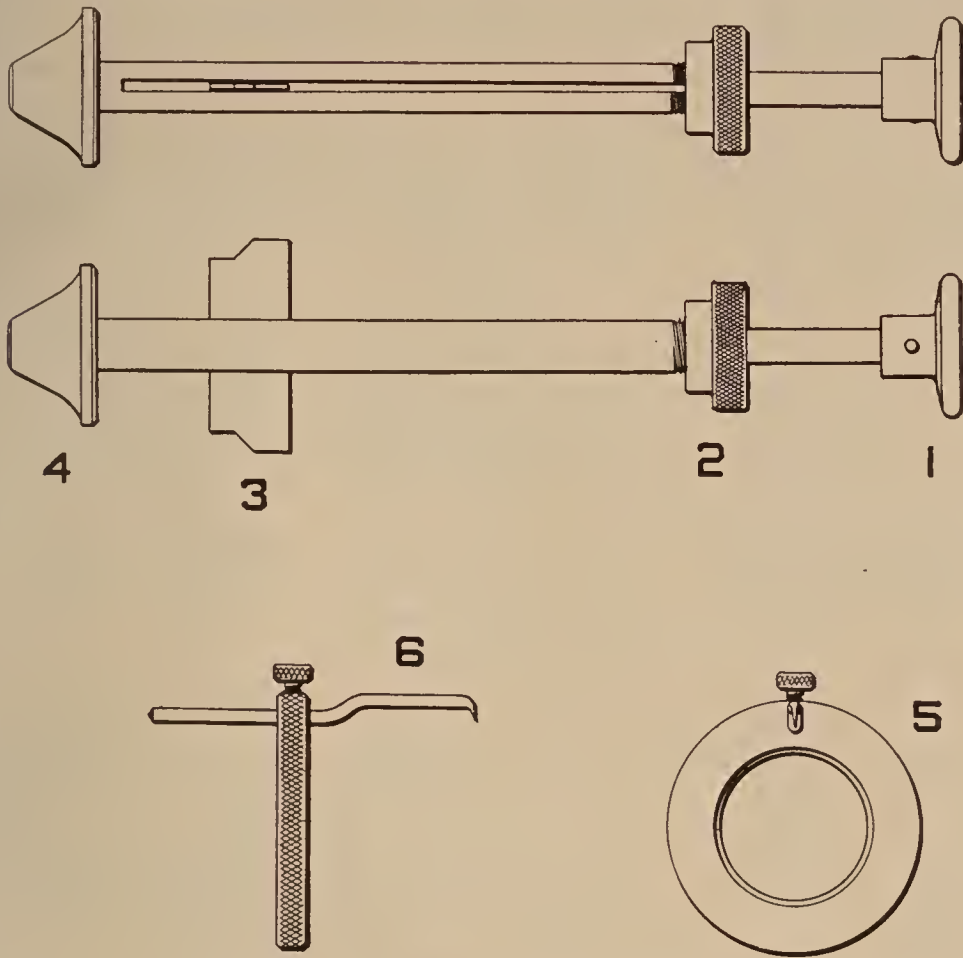
If it is found necessary to apply a new forcer steam valve a so-called repair valve should be used. This valve as furnished has an extra amount of stock on the seat to compensate for the material removed from the body seat by reseating. To properly machine this valve, it should be screwed onto a steel mandril fitted to the spindle of a lathe. The back end of the valve is faced so that if it is brought up against the face of the mandril it should be true. Be sure there is no lost motion in the threading of the mandril as, if the forcer steam valve does not fit tight, it will not run true. The cut illustrates the usual form of mandril with the valve screwed onto it.



To properly fit the compound forcer steam valve to the Inspirator body we have designed and are prepared to supply gauges as illustrated. Instructions for their use follow.

Insert gauge until figure 4 rests firmly on seat, then push in handle 1 until gauge 3 engages with its seat, tighten up screw 2 to hold adjustment, set ring of gauge 5 on part 4 with the faces engaging, then set pointer 6 to

the proper seat on gauge 3 (see next paragraph), then with this setting remove gauge 5 and place it on the piston end of the forcer steam valve,



taking care to hold this valve to the extreme end of its travel, then scratch with pointer 6 on seat of main valve cutting seat back to this mark and grind valve to its seat in Inspirator Body.

If the valve to be repaired is of the type equipped with a lifter steam valve (126A), the gauge should be set to a point $\frac{1}{64}$ of an inch back of the upper shoulder on the 45 degree or flat seat as Injector being repaired requires; this will allow clearance in the piston end while seating.

If the valve is of the type without the lifter steam valve (No. 126H) the pointer should be set $\frac{3}{32}$ of an inch back of the upper shoulder of the 45 degree or flat seat.

In applying the compound forcer steam valve to the Inspirator body the following points will be observed.

Valve Seats

All Hancock Lifting Inspirators, as now made, have solid valve seats excepting the Final Overflow Valves which have removable seats; however,

forcer steam seat rings can be inserted when the solid body seats have been worn through, thus prolonging the life of the bodies. If a removable seat is applied be sure that it makes a perfect joint between itself and the body. We make special tools for easily applying or removing these seats when it becomes necessary to make renewals. (See pages 20-21.)

Whenever it becomes necessary to reseat any of the valve seats the reseating tools, shown on pages 22-23 should be used before regrinding.

To secure the best results the reseating tools should be used in the following manner:

Screw the cast iron guide piece (B) to its shoulder. The cutter (C) is then fed against the seat by nut (A), care being taken to remove as little metal as possible to get a true seat, consequently nut (A) should be fed very slowly and carefully. After this operation the valve can be easily reground in the usual manner.

In grinding, emery should never be used. After reseating, sand or quartz should be used.

Final Overflow Disc

In repairing the Final Overflow Disc, if it becomes necessary to square up its face, the short cylindrical projection under the face should be left the same diameter, and the cylindrical projection as much longer as has been squared from the face of the disc. In squaring up and reseating the seat a proper tool for doing this should be used, and as little taken from the seat as possible to make it true.

The distance from the point where the self adjusting disc valve seats to the center of the pin (Nos. 145, 225, 345, 445 and 545) in the lever, will remain the same, although the valve and its seat has been resealed. The point of opening to the Forcer Steam Nozzle will bear the same relation to the amount of opening of the Final Overflow Valve (Nos. 117-C, 250, 358, 458 and 558) that was originally established, regardless of the increased travel of the lever; so that while the lever, when closed, will go in further and the valve will travel further on the self adjusting disc stud, the relation above referred to will not be disturbed.

Assembly

After having restored all of the valve seats in the body to a perfect condition, grind the forcer steam valve 126A or H and couple it securely to the steam valve stem No. 146, which has already been inserted into the steam valve bonnet No. 158 and packing nut No. 128. These parts will then be ready for application to the body. Next grind the intermediate overflow

valve No. 121 to its seat and see that it fits properly in the bonnet No. 120, for a loose fit at this point will not insure a proper seating of the valve and might cause the Inspirator to fail. The lift of the intermediate overflow valve must not be permitted, by reason of reseating or grinding, to exceed its original limit by more than $\frac{1}{8}$ ". The original lift for this valve in all sizes, Types A, B, Composite, E and F, is $\frac{5}{16}$ "; Type G, $\frac{3}{8}$ ". Excessive lift may be taken up by slipping a washer of proper thickness over the stem of the valve. The final overflow valve No. 117 should then be ground to its seat and care should be taken to see that the joint between the removable seat and the body is tight. The tubes and nozzles should then be *screwed to their seats* being careful to note that all bear the same capacity number, and all of the other parts of the Inspirator assembled in place. A certain definite amount of steam valve opening is necessary for the best performance of the Inspirator and this amount is determined by pushing the lever No. 137 toward the body as far as it will go and with some sharp instrument mark, the stem No. 146 close to the packing nut No. 128, then pull the lever back until the final overflow valve No. 117 is closed and measure the distance from the mark on the stem to the packing nut. This indicates the travel of the forcer steam valve and for types A, B and Composite should be at least $\frac{9}{16}$ " for a No. 7 Inspirator, $\frac{5}{8}$ " for a No. 8, No. 9 or No. 9½ and $\frac{5}{8}$ " for a No. 10 or No. 11 Inspirator. A slightly greater travel will not affect the working of the Inspirator, but in all cases it should be no less than the prescribed distances.

Repair men should carefully discriminate between those parts which are completely worn out and those which may be made to perform still further service. A forcer tube No. 104, which may become somewhat worn on the delivery end, may be reamed out and made to give a considerably longer service. When reaming, forcer tube reamers made by the Hancock Inspirator Co. only should be used, and care taken to leave at least $\frac{1}{8}$ " of the throat, or smallest diameter of the tube. If throat is enlarged the tube is spoiled. A forcer steam valve No. 126A or H may have its seat trued up in a lathe and give service for an appreciable length of time.

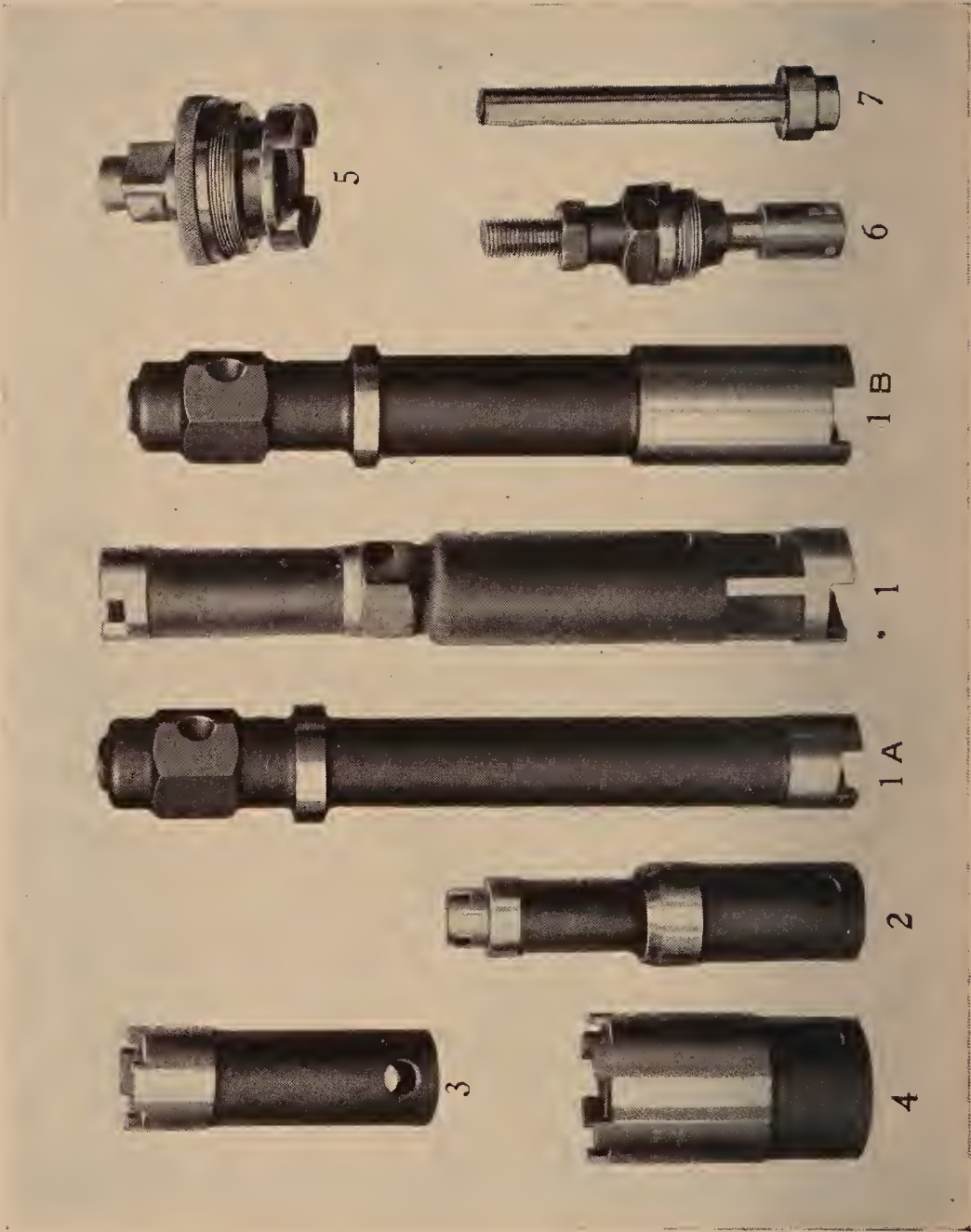
These general instructions for repairing will apply to all types of Hancock Lifting Inspirators. Types E, EA, F and G have the stroke of the steam valve stem controlled by a block or capacity plate No. 364, 464 or 564, on which is indicated the maximum capacity in gallons per hour. The Inspirators, types E, EA, F and G, have a wide range of capacities, by changing the tubes and nozzles from 2500 to 5500 gallons per hour with a

minimum capacity of about 50 per cent. of the maximum, and whenever a change is made in the size of the tubes and nozzles a capacity plate No. 364, 464 or 564, must be applied corresponding to the capacity of the tubes in order to establish the proper movement of the steam valve. This movement should be at least $\frac{1}{2}$ " for 2500 gallons, $\frac{9}{16}$ " for 3000 gallons, $\frac{19}{32}$ " for 3500 gallons, $\frac{5}{8}$ " for 4000 gallons, $\frac{23}{32}$ " for 4500 or 5000 gallons and $\frac{3}{4}$ " for 5500 gallons. The movement for all sizes of Type G Inspirators should be $\frac{3}{4}$ ". Should it be found necessary at any time to supply a new crank-holder No. 322, 422 or 522, which numbers indicate this part on the Types E, F and G respectively, apply a capacity plate corresponding to the capacity of the tubes to be used. Having applied the crank-holder, pull out the lever to the extreme and measure the stroke of the stem No. 346, 446 or 546 and if this be found to be greater than the prescribed amount, face off that part of the crank-holder which rests upon the capacity plate until the correct travel is obtained.

TABLE OF DIMENSIONS OF THE HANCOCK LOCOMOTIVE
INSPIRATOR COUPLING NUT THREADS

Size	Steam.		Suction		Delivery		Overflow	
	Dia.	Thread	Dia.	Thread	Dia.	Thread	Dia.	Thread
Type A								
5-6	$1\frac{31}{32}$	10	$1\frac{31}{32}$	10	$1\frac{31}{32}$	10	2	14
7	$2\frac{3}{8}$	10	$2\frac{3}{8}$	10	$2\frac{3}{8}$	10	$2\frac{1}{4}$	14
8-9	2.822	10	3.02	10	2.822	10	$2\frac{1}{4}$	14
10-11	3.02	10	$3\frac{1}{2}$	10	3.02	10	$2\frac{1}{4}$	14
Type B								
5-6-7	$2\frac{3}{8}$	10	$2\frac{3}{8}$	10	$2\frac{3}{8}$	10	$2\frac{1}{4}$	14
8-9	3.0114	8	3.0114	8	3.0114	8	$2\frac{1}{4}$	14
10-11	3.0114	8	$3\frac{1}{2}$	10	3.0114	8	$2\frac{1}{4}$	14
Types E—EA								
E-E-a	3.02	10	$3\frac{1}{2}$	10	3.02	10	3.02	10
Type F								
F	3.0114	8	$3\frac{1}{2}$	8	3.0114	8	3.0114	8
Type G								
G	$3\frac{1}{2}$	10	4	10	$3\frac{1}{2}$	10	$3\frac{1}{2}$	10
Composite								
Medium..	$2\frac{7}{8}$	14	$2\frac{1}{4}$	14	$2\frac{1}{4}$	14	$2\frac{1}{4}$	14
Large....	$2\frac{7}{8}$	14	$2\frac{7}{8}$	14	$2\frac{7}{8}$	14	$2\frac{1}{4}$	14
Special...	$3\frac{1}{2}$	10	$3\frac{1}{2}$	10	$2\frac{7}{8}$	14	$2\frac{7}{8}$	14
Extra....	4	10	4	10	$3\frac{1}{2}$	10	$3\frac{1}{2}$	10

TUBE AND SEAT WRENCHES FOR HANCOCK INSPIRATORS



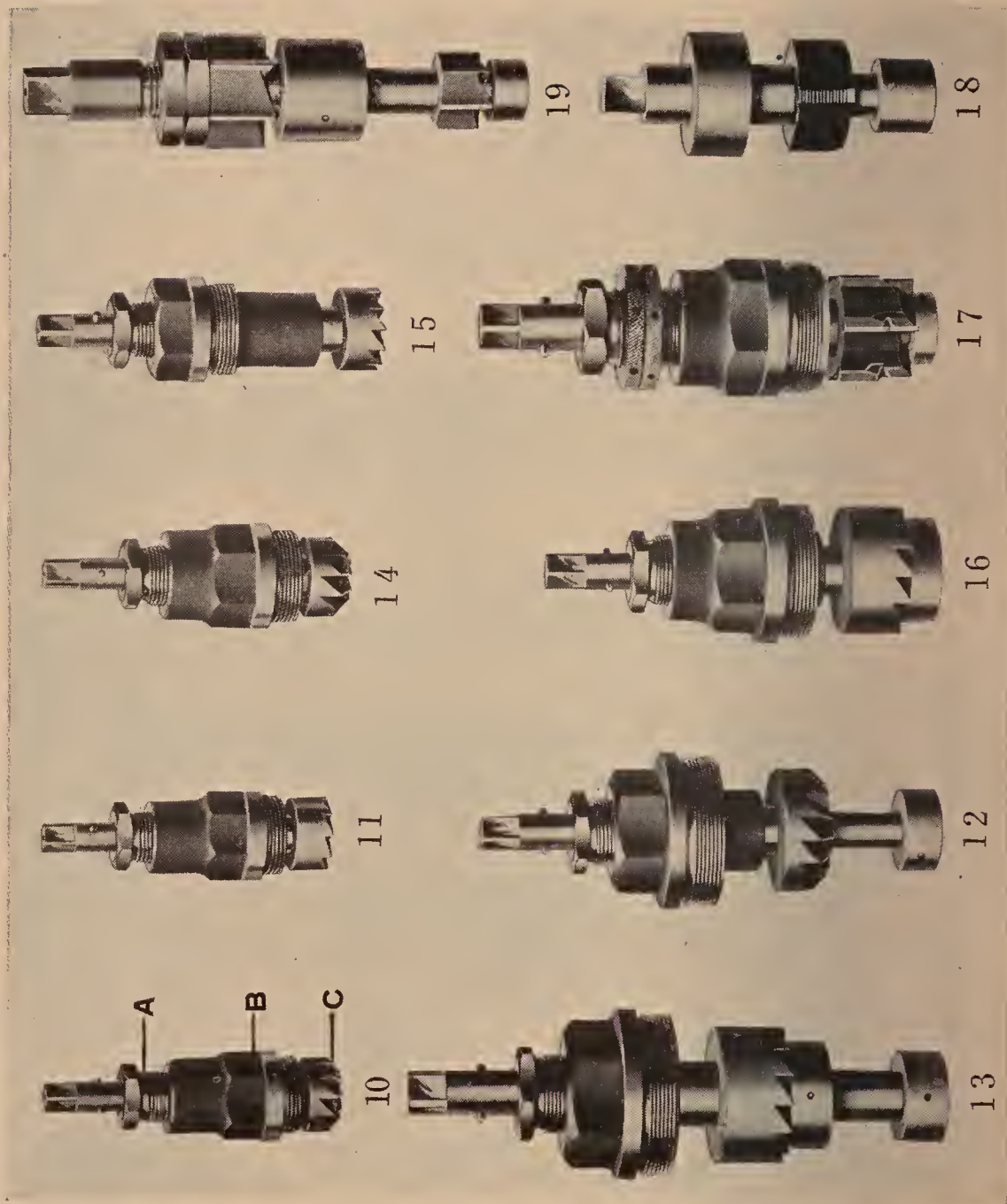
TUBE AND SEAT WRENCHES FOR HANCOCK INSPIRATORS

Fig. No.	Name	Types of Inspirators for which Furnished
1	Combination Tube and Nozzle Wrench	All
*1-A	Nozzle Wrench.....	All
*1-B	Tube Wrench	All
2	Final Overflow Seat	E, E-A and F
3	Intermediate Overflow Seat...	E, E-A and F
4	Forcer Steam Valve Seat	8, 9, 9½, 10, 11, A and B, Large, Special and Extra Composite, E, E-A, F and G.
5	Special Lifter Nozzle.....	A, B, Composite, E, E-A, F and G
6	Overflow Bushing Extractor ..	A and B
7	Overflow Bushing Driver	A and B

*These wrenches regularly made of cast steel. Can be furnished of Chrome Vanadium Tool Steel on special order.

Note: In ordering, specify Fig. No. and name of tool required, also size and type of Inspirator for which wanted.

RESEATING TOOLS FOR HANCOCK INSPIRATORS



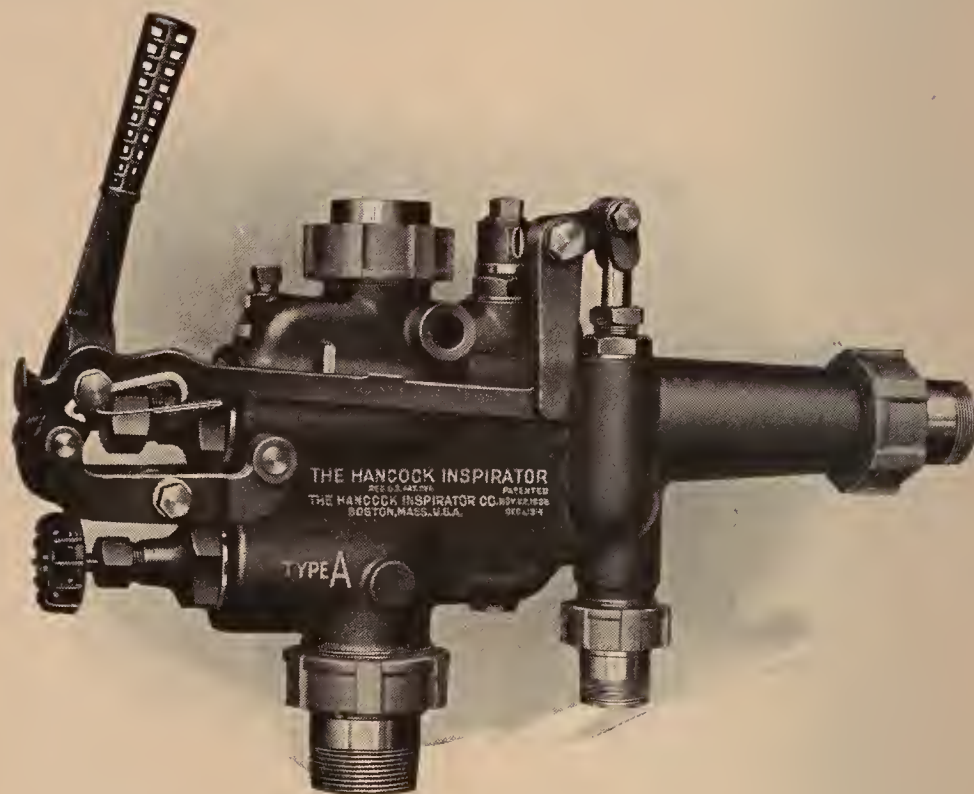
RESEATING TOOLS FOR HANCOCK INSPIRATORS

Fig. No.	Name	Types of Inspirators for which Furnished
10	Lifter Steam Valve Seat.....	A, B and Composite
10	Regulating Valve Seat	HNL and LNL
11	Lifter Steam Valve Seat.....	E, E-A, F and G
11	Operating Valve Auxiliary Disc	HNL and LNL
12	Forcer Steam Valve Seat	A, B and Medium, Large and Special Composite
13	Forcer Steam Valve Seat	Extra Composite, E, E-A, F, G, HNL, LNL and MNL
14	Intermediate Overflow Valve Seat	A, B, Composite, E, E-A, F, G, HNL, LNL and MNL
15	Final Overflow Valve Seat....	A, B, Composite, E, E-A, F, G, HNL, LNL and MNL
16	Delivery Check Valve Seat ...	HNL, LNL and MNL
17	Boring Tool for Applying Steam Valve Seat	8, 9, 9½, 10 & 11 A and B, Large and Special Composite, E, E-A, F, G, HNL, LNL and MNL
18	Tap for Applying Steam Valve Seat	8, 9, 9½, 10 & 11 A and B, Large and Special Composite, E, E-A, F, G, HNL, LNL and MNL
19	Lifter and Forcer Tubes and Nozzles	A, B, Composite, E, E-A, F and G

Note: In ordering, specify Fig. No. and name of tool required also size and type of Inspirator for which wanted.

THE HANCOCK INSPIRATOR

Type A



The principle and general construction of all Hancock Lifting Inspirators is the same. The types vary only to fit different connections or to group different tube capacities in the same body.

Type A fits the Monitor connections and interchanges with all injectors having corresponding coupling dimensions.

Type A, sizes 5 and 6, have the same body and interchange. Sizes 8, 9 and $9\frac{1}{2}$ have the same body and interchange. Sizes 10 and 11 have the same body and interchange. When desired, we will furnish tubes, sizes 9 or $9\frac{1}{2}$, to fit Nos. 10 and 11 body.

THE HANCOCK INSPIRATOR

Type A

Capacities and Connections

Size	Capacity Gallons per Hour	PIPE CONNECTION					
	200 lbs. Steam	Steam and Delivery		Suction		Overflow	
		Iron	Copper	Iron	Copper	Iron	Copper
5	1240	1 1/4"	1 1/2"	1 1/4"	1 1/2"	1 1/4"	1 1/2"
6	1610	1 1/4"	1 1/2"	1 1/4"	1 1/2"	1 1/4"	1 1/2"
7	2040	1 1/2"	1 3/4"	1 1/2"	1 3/4"	1 1/2"	1 3/4"
8	2710	2"	2"	2"	2 1/4"	1 1/2"	1 3/4"
9	2980	2"	2"	2"	2 1/4"	1 1/2"	1 3/4"
9 1/2	3300	2"	2"	2"	2 1/4"	1 1/2"	1 3/4"
10	4060	2"	2 1/4"	2 1/2"	2 3/4"	1 1/2"	1 3/4"
11	4420	2"	2 1/4"	2 1/2"	2 3/4"	1 1/2"	1 3/4"

DIRECTIONS FOR ORDERING.—State size and type and whether the connections are to be for iron or copper pipe.

Unless otherwise specified, we furnish, for steam connection, brazing nipple for copper pipe; for suction, delivery and overflow connections, threaded nipples for iron pipe.

The Line Check Valve for Type A is made in three different designs as shown on pages 46, 48 and 50. One of these is furnished with each Inspirator, the type being optional with the customer. When not otherwise specified the No. 111 Line Check Valve will be furnished.

If to be located outside of cab, so specify. For outside cab connections, see page 51.

Size of Hancock Fittings to be Used

Size of Hancock Inspirator Type A	Main Steam Valve	Line Check Valve	Boiler Check Valve	Locomotive Hose Strainer	Smallest Size of Suc- tion Hose to be Used
	Number	Number	Number	Number	
5	3	3	3	6	2"
6	3	3	3	6	2"
7	4	4	4	6	2 1/2"
8	5	5	5	6	3"
9	5	5	5	6	3"
9 1/2	5	5	5	6	3"
10	6	5	6	6	3"
11	6	5	6	6	3"

Larger sizes of valves and suction hose may be used, but they should never be smaller than above.

THE HANCOCK INSPIRATOR

Type B



The principle and general construction of all Hancock Lifting Inspirators is the same. The types vary only to fit different connections or to group different tube capacities in the same body.

Type B fits the Sellers connections and interchanges with all injectors having corresponding coupling dimensions.

Type B, sizes 5, 6 and 7, have the same body and interchange. Sizes 8, 9 and 9½ have the same body and interchange. Sizes 10 and 11 have the same body and interchange. When desired, we will furnish tubes, sizes 9 or 9½ to fit Nos. 10 and 11 body.

THE HANCOCK INSPIRATOR

Type B

Capacities and Connections

Size	Capacity Gallons per Hour 200 lbs. Steam	PIPE CONNECTIONS					
		Steam and Delivery		Suction		Overflow	
		Iron	Copper	Iron	Copper	Iron	Copper
5	1240	1 1/2"	1 3/4"	1 1/2"	1 3/4"	1 1/2"	1 3/4"
6	1610	1 1/2"	1 3/4"	1 1/2"	1 3/4"	1 1/2"	1 3/4"
7	2040	1 1/2"	1 3/4"	1 1/2"	1 3/4"	1 1/2"	1 3/4"
8	2710	2"	2"	2"	2 1/4"	1 1/2"	1 3/4"
9	2980	2"	2"	2"	2 1/4"	1 1/2"	1 3/4"
9 1/2	3300	2"	2"	2"	2 1/4"	1 1/2"	1 3/4"
10	4060	2"	2 1/4"	2 1/2"	2 3/4"	1 1/2"	1 3/4"
11	4420	2"	2 1/4"	2 1/2"	2 3/4"	1 1/2"	1 3/4"

DIRECTIONS FOR ORDERING.—State size and type and whether the connections are to be for iron or copper pipe.

Unless otherwise specified, we furnish, for steam connection, brazing nipple for copper pipe; for suction, delivery and overflow connections threaded nipples for iron pipe.

The Line Check Valve for Type B, is made in three different designs as shown on pages 46, 48 and 50. One of these is furnished with each Inspirator, the type being optional with the customer. When not otherwise specified, the No. 111 Line Check Valve will be furnished.

If to be located outside of cab, so specify. For outside cab connections, see page 51.

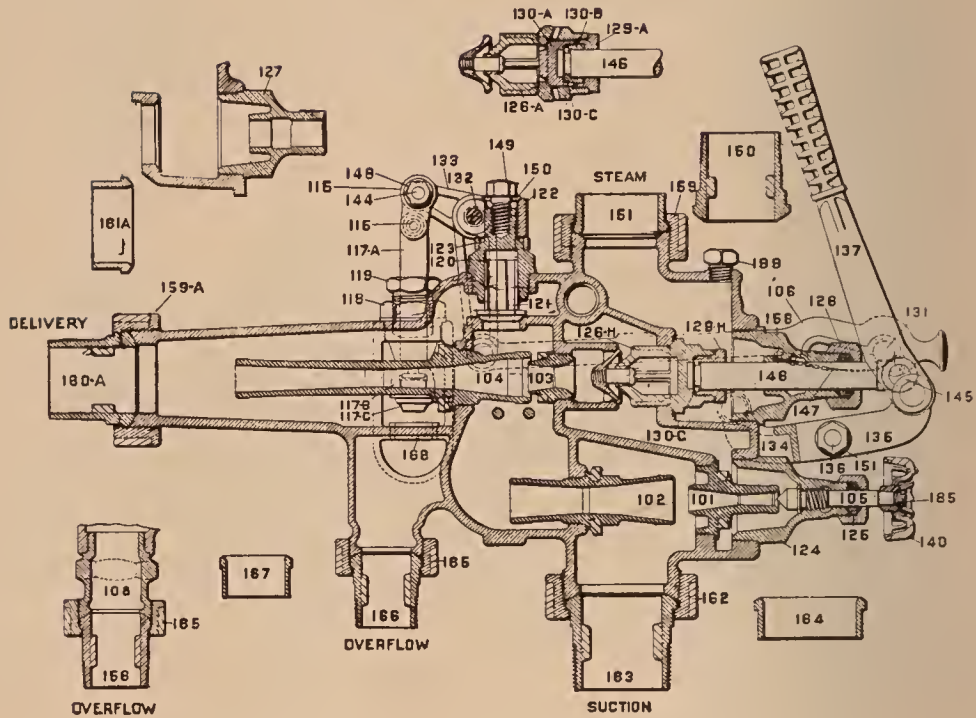
Size of Hancock Fittings to be Used

Size of Hancock Inspirator Type B	Main Steam Valve	Line Check Valve	Boiler Check Valve	Locomotive Hose Strainer	Smallest Size of Suc- tion Hose to be used
	Number	Number	Number	Number	
5	4	4	4	6	2 1/2"
6	4	4	4	6	2 1/2"
7	4	4	4	6	2 1/2"
8	5	5	5	6	3"
9	5	5	5	6	3"
9 1/2	5	5	5	6	3"
10	6	5	6	6	3"
11	6	5	6	6	3"

Larger sizes of valves and suction hose may be used, but they should never be smaller than above.

THE HANCOCK INSPIRATOR

Types A and B



The Hancock Inspirators, Types A and B differ only in the form of the bodies and connections.

When ordering repair parts, use numbers and names given on opposite page; also specify size and type of the Inspirator for which they are required.

Inspirators bearing serial numbers lower than 294576, require bonnet for steam valve, part No. 127 instead of No. 158.

LIST OF PARTS FOR THE HANCOCK INSPIRATOR

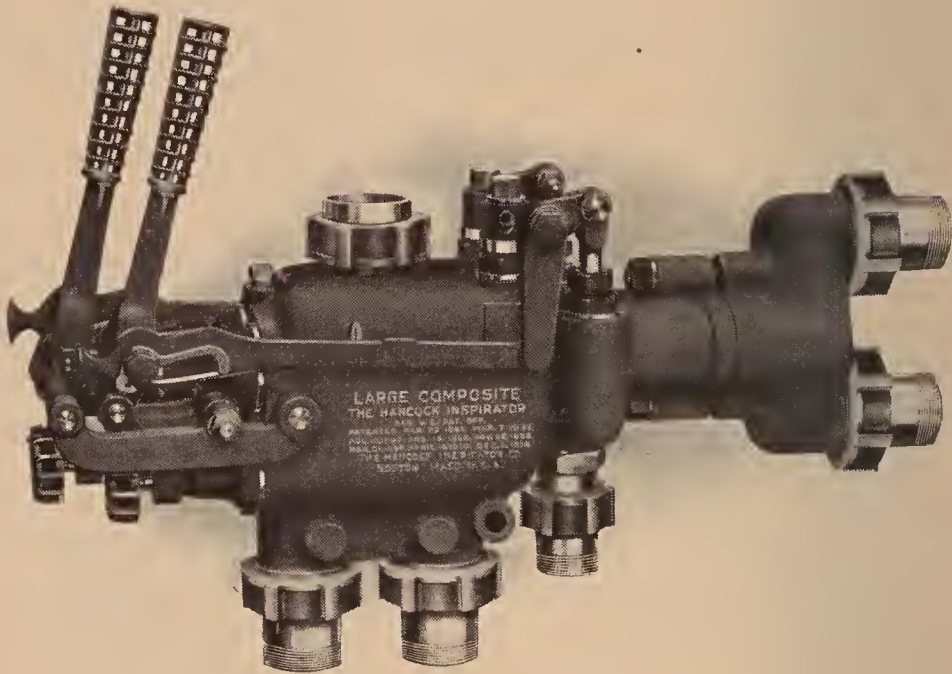
Types A and B

Part No.	Name	Part No.	Name
101	Lifter Nozzle	136	Side Strap Bolt
102	Lifter Tube	137	Lever
103	Forcer Nozzle	140	Regulating Wheel
104	Forcer Tube	143	Regulating Wheel Screw
105	Regulating Stem with Nut	144	Connecting Link Bolt
106	Heater Rod	145	Lever Pin
107	Clean Out Plug	146	Steam Stem
108	Overflow Nozzle	147	Heater Conn. Rod Spring
115	Connecting Links	148	Connecting Link Bolt Nut
116	Connecting Link Pin	149	Overflow Cap Screw
117A	Final Overflow Stem	150	Overflow Washer
117B	Final Overflow Disc Nut	151	Side Strap Bolt Nut
117C	Final Overflow Disc	152	Name Plates, per Pair
118	Final Overflow Bonnet	153	Name Plate Stud
119	Final Overflow Packing Nut	154	Name Plate Screw
120	Intermediate Overflow Bonnet	157	Steam Valve Seat
121	Intermediate Overflow Valve	158	Steam Bonnet (New Style)
122	Overflow Crank Holder	159	Coupling Nut, Steam
123	Adjusting Ring	159A	Coupling Nut, Delivery
124	Regulating Bonnet	159B	Long Coupling Nut, Delivery (for No. 111 Line Check)
125	Regulating Packing Nut	160	Threaded Nipple, Steam
126A	Compound Forcer Steam Valve (Old design—with Lifter)	160A	Threaded Nipple, Delivery
126H	Compound Forcer Steam Valve	161	Brazing Nipple, Steam
127	Steam Bonnet (Old Style)	161A	Brazing Nipple, Delivery
128	Steam Valve Packing Nut	162	Coupling Nut, Suction
129A	Steam Valve Coupling Nut for 126A	163	Threaded Nipple, Suction
129H	Steam Valve Coupling Nut for 126H	164	Brazing Nipple, Suction
130A	Lifter Steam Valve for 126A	165	Coupling Nut, Overflow
130B	Steam Valve Swivel Ring for 126A.	166	Threaded Nipple, Overflow
130C	Steam Valve Clamp Ring	167	Brazing Nipple, Overflow
131	Heater Rod Stud	168	Final Overflow Seat
132	Overflow Crank Stud	169	Oil Plug
133	Overflow Crank	185	Regulating Wheel Nut
134	Side Strap, R. H	196	Overflow Crank Stud Nut
135	Side Strap, L. H		

Intermediate or Line Check Valve parts see pages 46 to 50. Tube and Seat Wrenches, see pages 20-21. Reseating Tools, see pages 22-23. The Hancock Detachable Coupling Nut, see page 52.

THE HANCOCK INSPIRATOR

Type Composite



The Hancock Inspirator Type Composite comprises two separate Inspirators within one body, which may be operated separately or simultaneously as desired. Made in four sizes of body taking nine different sets of tubes, sizes Nos. 4 to 12, inclusive. Each apparatus has an independent suction pipe, delivery pipe and line check valve, thus enabling it to be operated independently of the other. There is but one steam pipe, one main steam valve and one overflow pipe required. The operation is the same as for Types A and B and the internal construction is the same.

THE HANCOCK INSPIRATOR

Type Composite

Capacities and Connections

Size of Body	Size Number of Tubes	Capacity in Gal. per Hour with 200 lbs. Steam Pressure	Size of Body	Size Number of Tubes	Capacity in Gal. per Hour with 200 lbs. Steam Pressure
Medium	4 x 4	1148 x 1148	Special	8 x 10	2885 x 4245
"	4 x 5	1148 x 1223	"	8 x 11	2885 x 4597
"	5 x 5	1223 x 1223	"	9 x 10	2992 x 4245
"	5 x 6	1223 x 1600	"	9½ x 10	3180 x 4245
"	5 x 7	1223 x 2085	"	9 x 11	2992 x 4597
"	6 x 6	1600 x 1600	"	10 x 10	4245 x 4245
"	6 x 7	1600 x 2085	"	10 x 11	4245 x 4597
"	7 x 7	2085 x 2085	"	11 x 11	4597 x 4597
Large	7 x 8	2085 x 2885	Extra	10 x 12	4245 x 6323
"	7 x 9	2085 x 2992	"	11 x 12	4597 x 6323
"	8 x 8	2885 x 2885	"	12 x 12	6323 x 6323
"	8 x 9	2885 x 2992			
"	9 x 9	2992 x 2992			
"	9½ x 9½	3180 x 3180			

Size of Body	PIPE CONNECTIONS							
	Steam		Suction		Delivery		Overflow	
	Iron	Copper	Iron	Copper	Iron	Copper	Iron	Copper
Medium	2"	2"	1½"	1¾"	1¼"	1½"	1½"	1¾"
Large	2"	2¼"	2"	2¼"	2"	2¼"	1½"	1¾"
Special	2½"	2¾"	2½"	2¾"	2"	2¼"	2"	2¼"
Extra	3"	3¼"	3"	3¼"	2½"	2¾"	2½"	2¾"

DIRECTIONS FOR ORDERING.—State type, size name (Medium, Large, etc.) of body, size number of tubes for each side and whether the connections are to be for iron or copper pipe.

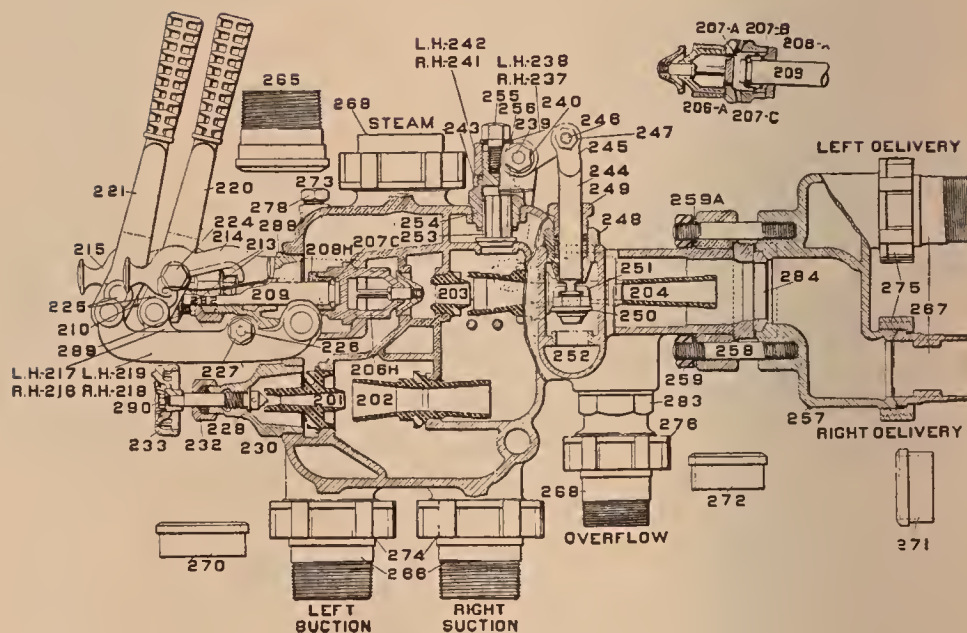
Unless otherwise specified, we furnish, for steam connection, brazing nipple for copper pipe; for suction, delivery and overflow connections, we furnish threaded nipples for iron pipe.

The Line Check Valves for Type Composite are made in three different designs as shown on pages 46, 48 and 50. Two valves of one of these designs are furnished with each Composite Inspirator, the type being optional with the customer. When not otherwise specified, the No. 111 Line Check Valve will be furnished for all sizes except the Extra which will be furnished with Swing Check Valves.

If to be located outside of cab so specify. For outside cab connections, see page 51.

THE HANCOCK INSPIRATOR

Type Composite



When ordering repair parts, use numbers and names given on opposite page; also state the size name (Medium, Large, etc.) of Inspirator for which they are required. When ordering tubes and nozzles also specify the size number or capacity. Inspirators bearing serial numbers lower than 292221 require bonnet for steam valve, part Nos. 211 or 212, instead of Nos. 288 or 289.

LIST OF PARTS FOR THE HANCOCK INSPIRATOR

Type Composite

Part No.	Name	Part No.	Name
201	Lifter Nozzle	243	Adjusting Ring
202	Lifter Tube	244	Final Overflow Stem
203	Forcer Nozzle	245	Connecting Links
204	Forcer Tube	246	Connecting Link Bolt
205	Forcer Steam Valve Seat	247	Connecting Link Bolt Nut
206A	Compound Forcer Steam Valve (Old design-with Lifter)	248	Final Overflow Bonnet
206H	Compound Forcer Steam Valve	249	Final Overflow Packing Nut
207A	Lifter Steam Valve for 206A	250	Final Overflow Disc
207B	Swivel Ring for 206A	251	Final Overflow Disc Nut
207C	Clamp Ring	252	Final Overflow Seat
208A	Steam Valve Coupling Nut for 206A	253	Intermediate Overflow Valve
208H	Steam Valve Coupling Nut for 206H	254	Intermediate Overflow Bonnet
209	Steam Stem, R. H.	255	Overflow Cap Screw
210	Steam Stem, L. H.	256	Overflow Washer
211	Steam Bonnet, R. H. (Old Style)	257	Delivery End Cap
212	Steam Bonnet, L. H. (Old Style)	258	Delivery End Cap Stud
213	Steam Packing Nut	259	Delivery End Cap Stud Nut
214	Heater Rod, R. H.	259A	Delivery End Cap Stud Washer
215	Heater Rod, L. H.	260	Delivery End Plug
216	Side Strap, Small, R. H.	265	Threaded Nipple, Steam
217	Side Strap, Small, L. H.	266	Threaded Nipple, Suction
218	Side Strap, Large, R. H.	267	Threaded Nipple, Delivery
219	Side Strap, Large, L. H.	268	Threaded Nipple, Overflow
220	Lever, R. H.	269	Brazing Nipple, steam
221	Lever, L. H.	270	Brazing Nipple, Suction
224	Heater Rod Stud	271	Brazing Nipple, Delivery
225	Lever Pin	272	Brazing Nipple, Overflow
226	Side Strap Bolt	273	Coupling Nut, Steam
227	Side Strap Bolt Nut	274	Coupling Nut, Suction
228	Regulating Stem, with Nut, R. H.	275	Coupling Nut, Delivery
229	Regulating Stem, with Nut, L. H.	276	Coupling Nut, Overflow
230	Regulating Bonnet, R. H.	278	Oil Plug
231	Regulating Bonnet, L. H.	279	Alarm Valve Plug
232	Regulating Packing Nut	280	Name Plate
233	Regulating Wheel	281	Name Plate Screw
236	Regulating Wheel Screw	282	Heater Rod Spring
237	Overflow Crank, R. H.	283	Overflow Nozzle
238	Overflow Crank, L. H.	284	Joint Ring
239	Overflow Crank Stud	287	Yoke
240	Overflow Crank Stud Nut	288	Steam Bonnet, Short
241	Overflow Crank Holder, R. H.	289	Steam Bonnet, Long
242	Overflow Crank Holder, L. H.	290	Regulating Wheel Nut

Intermediate or Line Check Valve Parts, see pages 46 to 50.

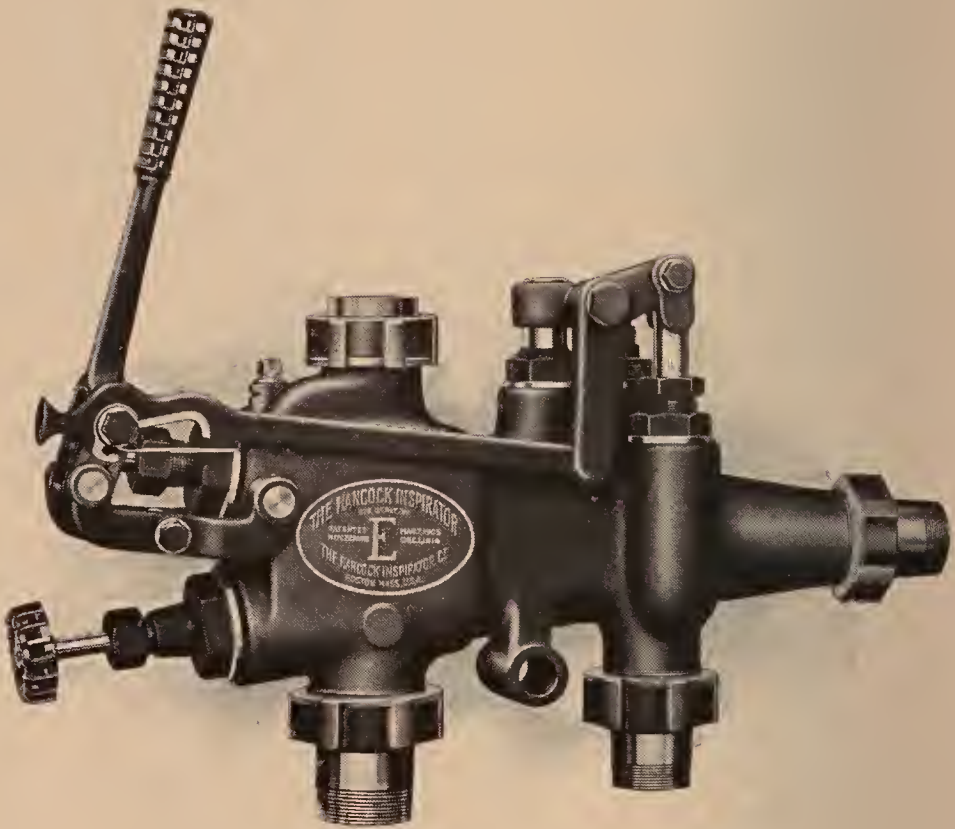
Tube and Seat Wrenches, see pages 20-21.

The Hancock Detachable Coupling Nut, see page 52.

Reseating Tools, see page 22-23.

THE HANCOCK INSPIRATOR

Type E



The principle and general construction of all Hancock Lifting Inspirators is the same. The types vary only to fit different connections or to group different tube capacities in the same body.

Type E is made in one standard body only. Furnished in seven capacities of from 2500 to 5500 gallons per hour by the insertion of different interchangeable sets of tubes.

THE HANCOCK INSPIRATOR

Types E and EA

TUBES AND CAPACITIES.—The type E is furnished with any of the following sets of tubes and nozzles:

Number	2500-E,	maximum capacity,	2500	gallons per hour
"	3000-E,	"	3000	" " "
"	3500-E,	"	3500	" " "
"	4000-E,	"	4000	" " "
"	4500-E,	"	4500	" " "
"	5000-E,	"	5000	" " "
"	5500-E,	"	5500	" " "

PIPE CONNECTIONS.—All Type E Inspirators have the following standard connections.

Steam, 2" iron or 2¼" O. D. copper pipe. Delivery, 2" iron or 2¼" O. D. copper pipe.

Suction, 2½" iron or 2¾" O. D. copper pipe. Overflow, 2" iron or 2¼" O. D. copper pipe.

DIRECTIONS FOR ORDERING.—State type of Inspirator, size, number of tubes (see table above) and whether the connections are to be for iron or copper pipe.

Unless otherwise specified, we furnish for steam connection, brazing nipple for copper pipe; for suction, delivery and overflow connections, threaded nipples for iron pipe.

The Line Check Valve for Type E is made in two different designs as shown on pages 46 and 48. One of these is furnished with each Inspirator, the type being optional with the customer. When not otherwise specified the Stem Guided Check Valve will be furnished.

If to be located outside of cab, so specify. For outside cab connections, see page 51.

SIZE OF FITTINGS

No. 6 Hancock Main Steam Valve.

No. 6 Hancock Boiler Check Valve.

2" x 2" Hancock Combined Stop and Check Valve.

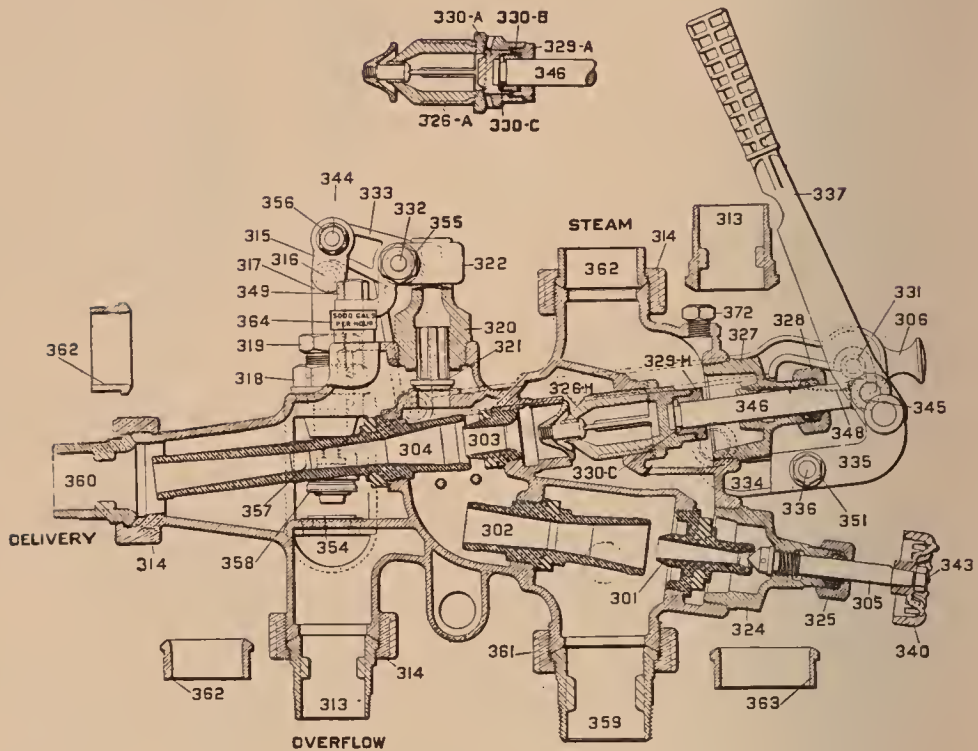
No. 7 Hancock Hose Strainer.

Suction Hose not less than 3 inch inside diameter.

Larger sizes of valves and suction hose may be used, but they should never be smaller than above.

THE HANCOCK INSPIRATOR

Types E and EA



Above sectional view shows a Type E Inspirator, but is correct for all parts of the Type EA except the body.

When ordering repair parts, use both numbers and names given on opposite page; also give type of the Inspirator for which they are required.

In addition, when ordering tubes or nozzles the capacity number (see preceding page) must be stated.

NOTE.—The tubes, nozzles and capacity plate (part No. 364) each has its capacity number either stamped or cast upon it. *It is absolutely essential that each of these five parts (Nos. 301, 302, 303, 304 and 364), when applied to an Inspirator, bear the same capacity number.*

LIST OF PARTS FOR THE HANCOCK INSPIRATOR

Types E and EA

Part No.	Name	Part No.	Name
301	Lifter Nozzle	331	Heater Rod Stud
302	Lifter Tube	332	Overflow Crank Stud
303	Forcer Nozzle	333	Overflow Valve
304	Forcer Tube	334	Side Strap, R. H
305	Regulating Stem with Nut	335	Side Strap, L. H
306	Heater Rod	336	Side Strap Bolt
313	Threaded Nipple, Steam and Overflow	337	Lever
314	Coupling Nut, Steam, Delivery and Overflow	340	Regulating Wheel
315	Connecting Links	343	Regulating Wheel Nut
316	Connecting Link Pin	344	Connecting Link, Bolt
317	Final Overflow Stem	345	Lever Pin
318	Final Overflow Bonnet	346	Steam Stem
319	Final Overflow Packing Nut	348	Heater Rod Spring
320	Intermediate Overflow Bonnet	349	Overflow Cap Screw
321	Intermediate Overflow Valve	351	Side Strap Bolt Nut
322	Overflow Crank Holder	352	Forcer Steam Valve Seat
324	Regulating Bonnet	353	Intermediate Overflow Valve Seat
325	Regulating Packing Nut	354	Final Overflow Seat
326A	Compound Forcer Steam Valve (Old design—with Lifter)	355	Overflow Crank Stud Nut
326H	Compound Forcer Steam Valve	356	Connecting Link Bolt Nut
327	Steam Bonnet	357	Final Overflow Disc Nut
328	Steam Packing Nut	358	Final Overflow Disc
329A	Steam Valve Coupling Nut for 326A	359	Threaded Nipple, Suction
329H	Steam Valve Coupling Nut for 326H	360	Threaded Nipple, Delivery
330A	Lifter Steam Valve for 326A	361	Coupling Nut, Suction
330B	Steam Valve Swivel Ring for 326A.	362	Brazing Nipple, Steam, Delivery and Overflow
330C	Steam Valve Clamp Ring	363	Brazing Nipple, Suction
		364	Capacity Plate
		372	Oil Plug

Tube and Seat Wrenches, see pages 20-21.

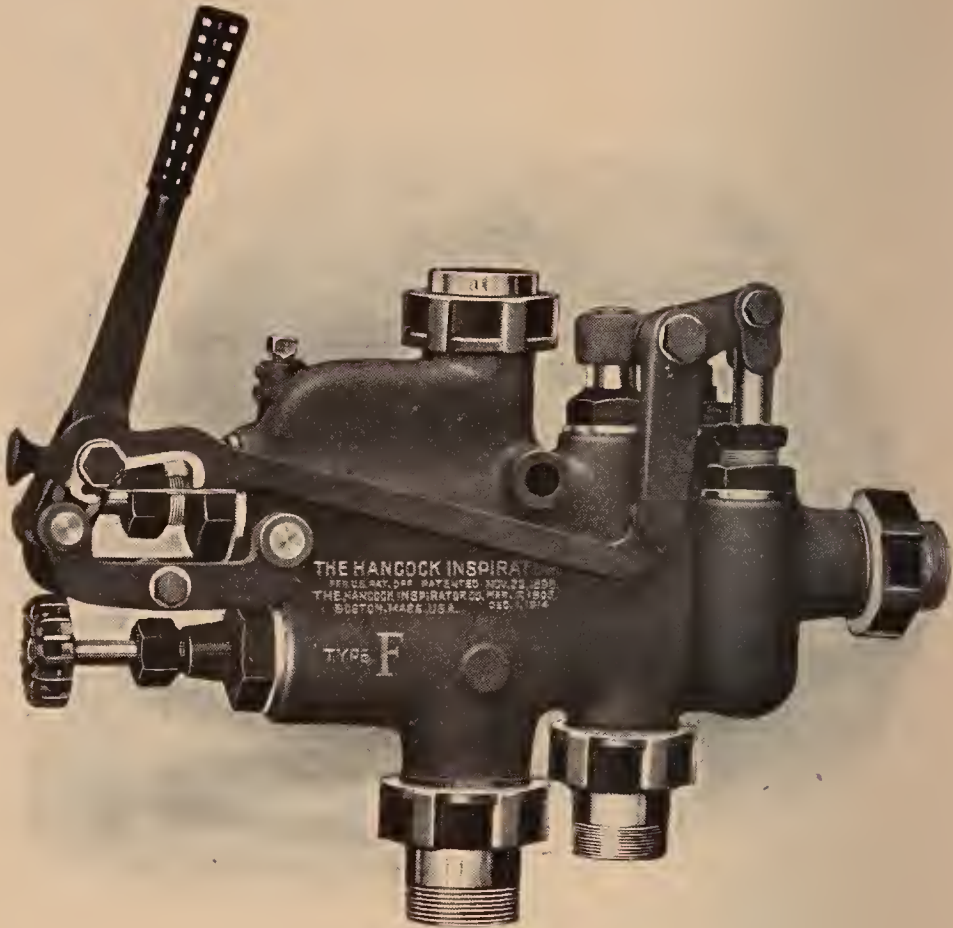
The Hancock Detachable Coupling Nut. see page 52.

Intermediate or Line Check Valve Parts, see pages 46 to 49.

Reseating Tools, see pages 22-23.

THE HANCOCK INSPIRATOR

Type F



The principle and general construction of all Hancock Lifting Inspirators is the same.

The types vary only to fit different connections or to group different tube capacities in the same body.

Type F is the same as Type E except in the location of its connections.

Type F is made in one standard body only. Furnished in seven capacities of from 2500 to 5500 gallons per hour by the insertion of different interchangeable sets of tubes.

THE HANCOCK INSPIRATOR

Type F

TUBES AND CAPACITIES.—The Type F is furnished with any of the following sets of tubes and nozzles:

Number 2500-F, maximum capacity, 2500 gallons per hour						
"	3000-F,	"	"	3000	"	"
"	3500-F,	"	"	3500	"	"
"	4000-F,	"	"	4000	"	"
"	4500-F,	"	"	4500	"	"
"	5000-F,	"	"	5000	"	"
"	5500-F,	"	"	5500	"	"

PIPE CONNECTIONS.—All Type F Inspirators have the following standard connections:

Steam, 2" iron or 2¼" O. D. Copper pipe. Delivery, 2" iron or 2¼" O. D. copper pipe.

Suction, 2½" iron or 2¾" O. D. copper pipe. Overflow, 2" iron or 2¼" O. D. copper pipe.

DIRECTIONS FOR ORDERING.—State type of Inspirator, size number of tubes (see table above) and whether the connections are to be for iron or copper pipe.

Unless otherwise specified, we furnish, for steam connection, brazing nipple for copper pipe; for suction, delivery and overflow connections, threaded nipples for iron pipe.

The Line Check Valve furnished with Type F is of the Stem Guided design shown on page 46.

If to be located outside of cab, so specify.

For outside cab connections, see page 51.

SIZE OF FITTINGS

No. 6 Hancock Main Steam Valve.

No. 6 Hancock Boiler Check Valve.

2" x 2" Hancock Combined Stop and Check Valve.

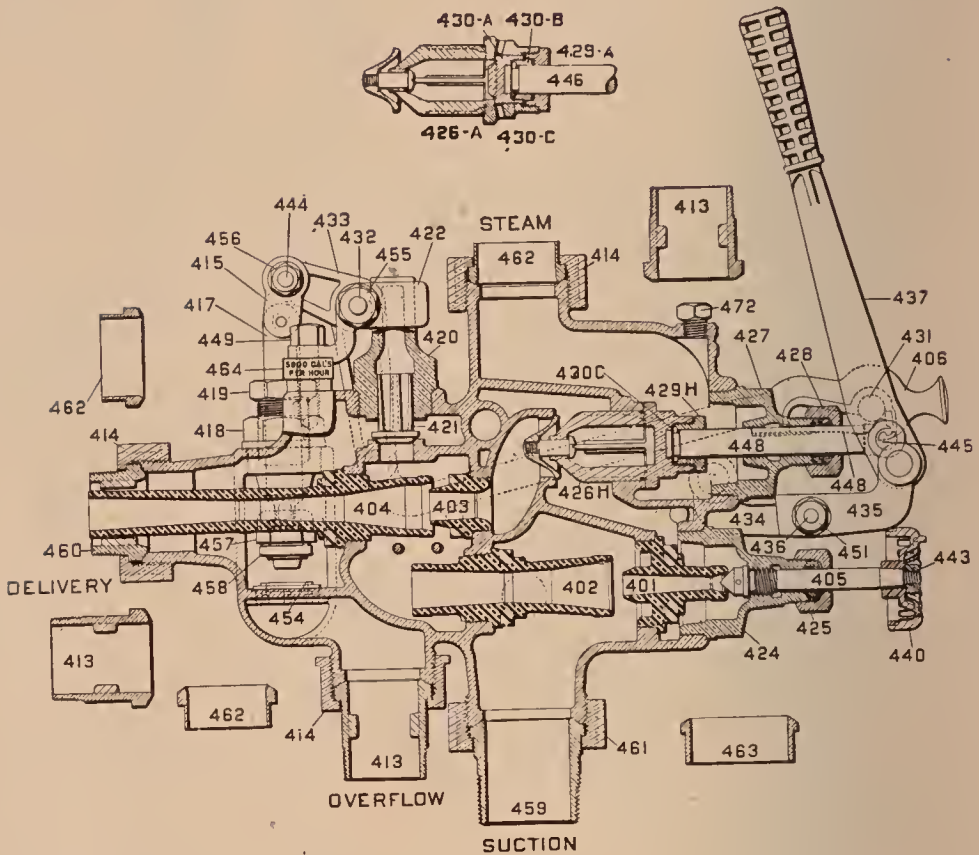
No. 7 Hancock Hose Strainer.

Suction Hose not less than 3 inch inside diameter.

Larger sizes of valves and suction hose may be used, but they should never be smaller than above.

THE HANCOCK INSPIRATOR

Type F



When ordering repair parts, use both numbers and names given on opposite page; also give type of the Inspirator for which they are required.

In addition, when ordering tubes or nozzles, the capacity number (see preceding page) must be stated.

NOTE.—The tubes, nozzles and capacity plate (part No. 464) each has its capacity number either stamped or cast upon it. *It is absolutely essential that each of these five parts (Nos. 401, 402, 403, 404 and 464), when applied to an Inspirator, bear the same capacity number.*

LIST OF PARTS FOR THE HANCOCK INSPIRATOR

Type F

Part No.	Name	Part No.	Name
401	Lifter Nozzle	431	Heater Rod Stud
402	Lifter Tube	432	Overflow Crank Stud
403	Forcer Nozzle	433	Overflow Valve
404	Forcer Tube	434	Side Strap, R. H
405	Regulating Stem with Nut	435	Side Strap, L. H
406	Heater Rod	436	Side Strap Bolt
413	Threaded Nipple, Steam and Overflow	437	Lever
414	Coupling Nut, Steam, Delivery and Overflow	440	Regulating Wheel
415	Connecting Links	443	Regulating Wheel Nut
416	Connecting Link Pin	444	Connecting Link Bolt
417	Final Overflow Stem	445	Lever Pin
418	Final Overflow Bonnet	446	Steam Stem
419	Final Overflow Packing Nut	448	Heater Rod Spring
420	Intermediate Overflow Bonnet	449	Overflow Cap Screw
421	Intermediate Overflow Valve	451	Side Strap Bolt Nut
422	Overflow Crank Holder	452	Forcer Steam Valve Seat
424	Regulating Bonnet	453	Intermediate Overflow Valve Seat.
425	Regulating Packing Nut	454	Final Overflow Seat
426A	Compound Forcer Steam Valve (Old design—with Lifter)	455	Overflow Crank Stud Nut
426H	Compound Forcer Steam Valve	456	Connecting Link Bolt Nut
427	Steam Bonnet	457	Final Overflow Disc Nut
428	Steam Packing Nut	458	Final Overflow Disc
429A	Steam Valve Coupling Nut for 426A	459	Threaded Nipple, Suction
429H	Steam Valve Coupling Nut for 426H	460	Threaded Nipple, Delivery
430A	Lifter Steam Valve for 426A	461	Coupling Nut, Suction
430B	Steam Valve Swivel Ring for 426A	462	Brazing Nipple, Steam, Delivery and Overflow
430C	Steam Valve Clamp Ring	463	Brazing Nipple, Suction
		464	Capacity Plate
		472	Oil Plug

Tube and Seat Wrenches, see pages 20-21.

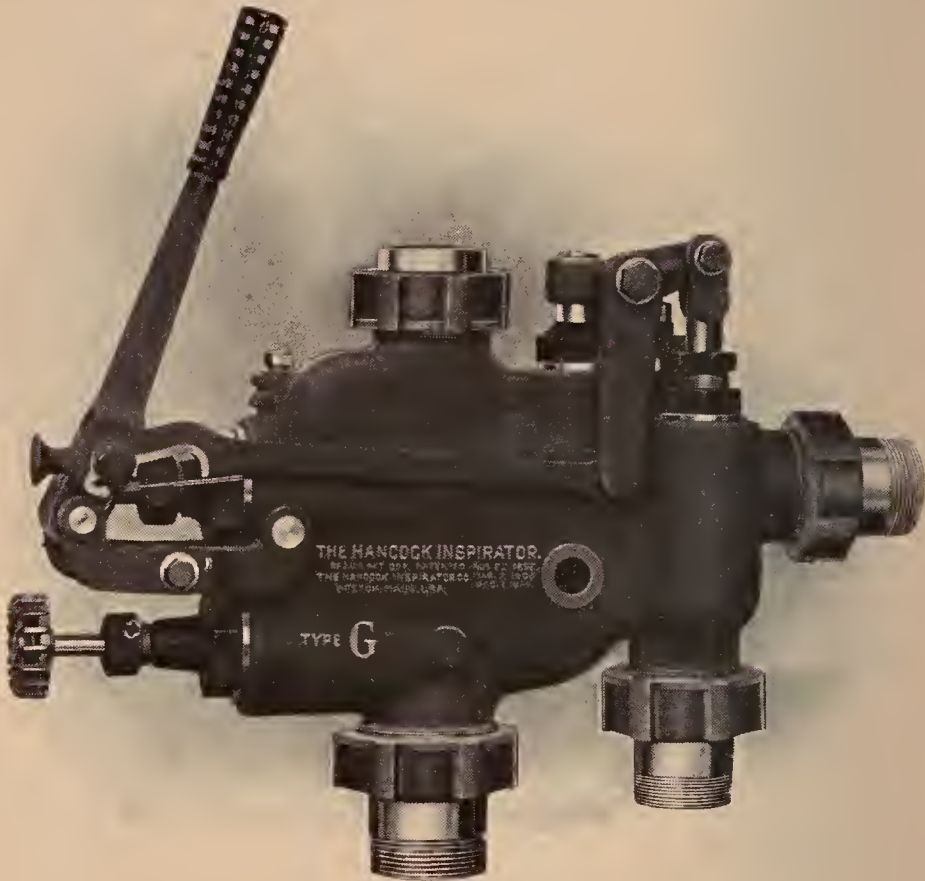
The Hancock Detachable Coupling Nut, see page 52.

Intermediate or Line Check Valve Parts. see page 46.

Reseating Tools, see page 22-23.

THE HANCOCK INSPIRATOR

Type G



The principle and general construction of all Hancock Lifting Inspirators is the same.

The types vary only to fit different connections or to group different tube capacities in the same body.

Type G is of similar design to Types E and F, being the larger size of those types.

Type G is made in one standard body only. Furnished in five capacities of 5000, 5500, 6000, 6500 and 7000 gallons per hour by the insertion of different interchangeable sets of tubes.

THE HANCOCK INSPIRATOR

Type G

TUBES AND CAPACITIES.—The Type G is furnished with any of the following sets of tubes and nozzles:

Number 5000-G, maximum capacity, 5000 gallons per hour

"	5500-G,	"	"	5500	"	"	"
"	6000-G,	"	"	6000	"	"	"
"	6500-G,	"	"	6500	"	"	"
"	7000-G,	"	"	7000	"	"	"

PIPE CONNECTIONS.—All Type G Inspirators have the following standard connections:

Steam, 2½" iron or 2¾" O. D. copper pipe. Delivery, 2½" iron or 2¾" O. D. copper pipe.

Suction, 3" iron or 3¼" O. D. copper pipe. Overflow, 2½" iron or 2¾" O. D. copper pipe.

DIRECTIONS FOR ORDERING.—State type of Inspirator, size number of tubes (see table above) and whether the connections are to be for iron or copper pipe.

Unless otherwise specified, we furnish, for steam connection, brazing nipple for copper pipe; for suction, delivery and overflow connections, threaded nipples for iron pipe.

The Line Check Valve furnished with Type G is of the Stem Guided design shown on page 46.

If to be located outside of cab, so specify.

For outside cab connections, see page 51.

SIZE OF FITTINGS.

No. 7 Hancock Main Steam Valve.

No. 7 Hancock Boiler Check Valve.

2½" x 2½" Hancock Combined Stop and Check Valve.

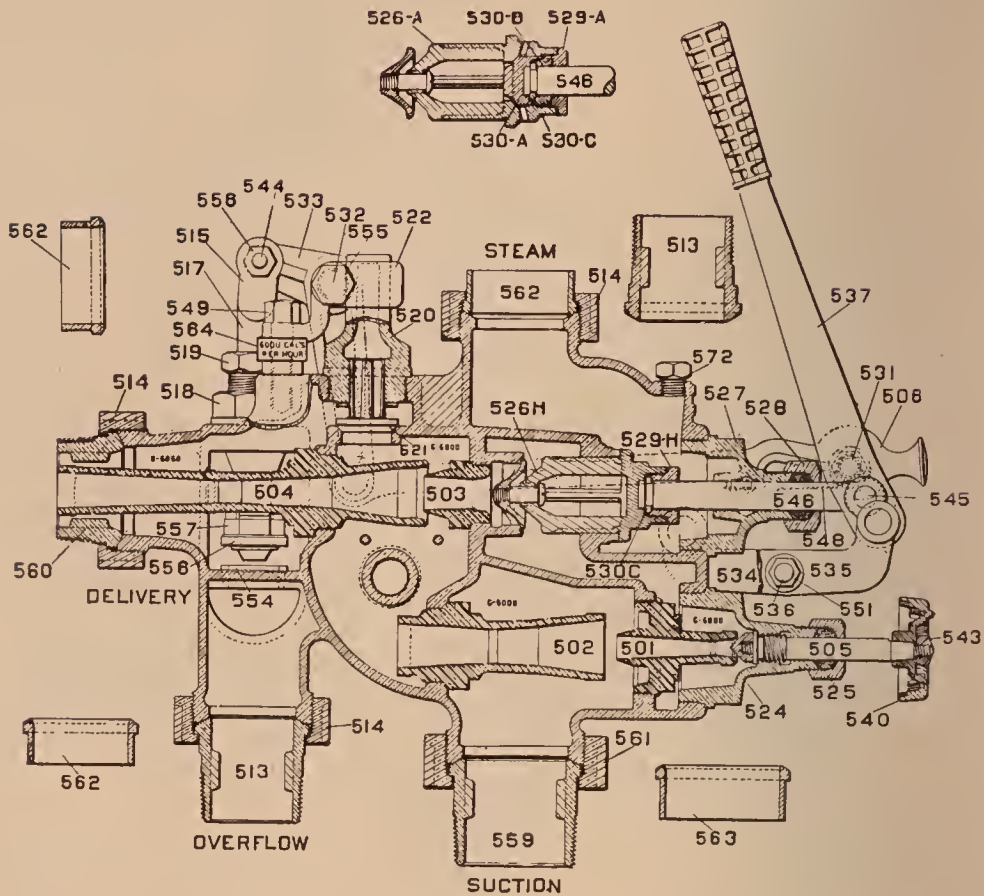
No. 7 Hancock Hose Strainer.

Suction Hose not less than 3½ inch inside diameter.

Larger sizes of valves and suction hose may be used, but they should never be smaller than above.

THE HANCOCK INSPIRATOR

Type G



When ordering repair parts, use both numbers and names given on opposite page; also give type of the Inspirator for which they are required.

In addition, when ordering tubes or nozzles, the capacity number (see preceding page) must be stated.

NOTE.—The tubes, nozzles and capacity plate (part No. 564) each has its capacity number either stamped or cast upon it. *It is absolutely essential that each of these five parts (Nos. 501, 502, 503, 504 and 564), when applied to an Inspirator, bear the same capacity number.*

LIST OF PARTS FOR THE HANCOCK INSPIRATOR

Type G

Part No.	Name	Part No.	Name
501	Lifter Nozzle	532	Overflow Crank Stud
502	Lifter Tube	533	Overflow Crank
503	Forcer Nozzle	534	Side Strap R. H
504	Forcer Tube	535	Side Strap L. H
505	Regulating Stem with Nut	536	Side Strap Bolt
506	Heater Rod	537	Lever
513	Threaded Nipple, Steam, Delivery and Overflow	540	Regulating Wheel
514	Coupling Nut, Steam, Delivery and Overflow	543	Regulating Wheel Nut
515	Connecting Links	544	Connecting Link Bolt
517	Final Overflow Stem	545	Lever Pin
518	Final Overflow Bonnet	546	Steam Stem
519	Final Overflow Packing Gland	548	Heater Rod Spring
520	Intermediate Overflow Bonnet	549	Overflow Cap Screw
521	Intermediate Overflow Valve	551	Side Strap Bolt Nut
522	Overflow Crank Holder	552	Forcer Steam Valve Seat
524	Regulating Valve Bonnet	554	Final Overflow Seat
525	Regulating Valve Packing Nut	555	Overflow Crank Stud Nut
526A	Compound Forcer Steam Valve (Old design—with Lifter)	556	Connecting Link Bolt Nut
526H	Compound Forcer Steam Valve	557	Final Overflow Disc Nut
527	Steam Bonnet	558	Final Overflow Disc
528	Steam Packing Nut	559	Threaded Nipple, Suction
529A	Steam Valve Coupling Nut for 526A	560	Threaded Nipple, Delivery, Short
529H	Steam Valve Coupling Nut for 526H	561	Coupling Nut, Suction
530A	Lifter Steam Valve for 526A	562	Brazing Nipple, Steam, Delivery and Overflow
530B	Steam Valve Swivel Ring for 526A	563	Brazing Nipple, Suction
530C	Steam Valve Clamp Ring	564	Capacity Plate
531	Heater Rod Stud	565	Name Plate
		566	Name Plate Screw
		572	Oil Plug

Tube and Seat Wrenches, see pages 20-21.

The Hancock Detachable Coupling Nut, see page 52.

Intermediate or Line Check Valve Parts, see page 47.

Reseating Tools, see pages 22-23.

THE HANCOCK STEM GUIDED INTERMEDIATE OR LINE
CHECK VALVE



Fig. 33



Fig. 32

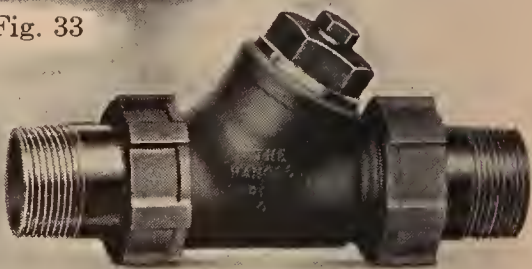


Fig. 34

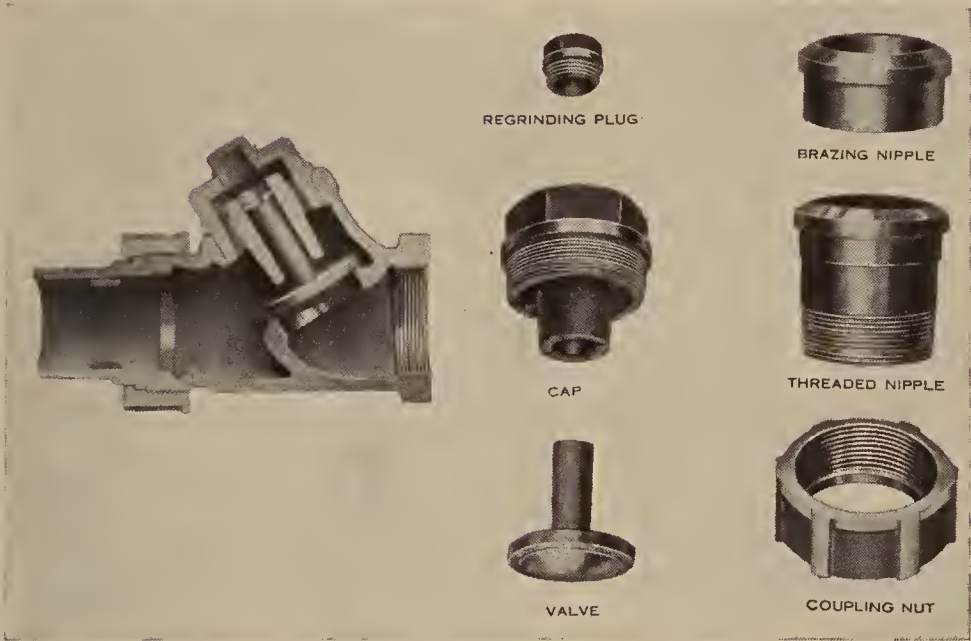
To be attached directly to the delivery end of the Inspirator or located close to it in the delivery line.

Size Numbers and Pipe Connections

Size	Description	PIPE CONNECTIONS			
		Inlet		Outlet	
		Iron	Copper	Iron	Copper
2	Female Inlet and Outlet Fig. 33	1"	.....	1"	.....
3		1 1/4"	.....	1 1/4"	.....
4		1 1/2"	.....	1 1/2"	.....
5		2"	.....	2"	.....
6		2 1/2"	.....	2 1/2"	.....
2	Female Inlet and Male Union Out- let..... Fig. 32	1"	.....	1"	1 1/4"
3		1 1/4"	.....	1 1/4"	1 1/2"
4		1 1/2"	.....	1 1/2"	1 3/4"
5		2"	.....	2"	2 or 2 1/4"
6		2 1/2"	.....	2 1/2"	2 3/4"
2	Male Union Inlet and Outlet..... Fig. 34	1"	1 1/4"	1"	1 1/4"
3		1 1/4"	1 1/2"	1 1/4"	1 1/2"
4		1 1/2"	1 3/4"	1 1/2"	1 3/4"
5		2"	2 or 2 1/4"	2"	2 or 2 1/4"
6		2 1/2"	2 3/4"	2 1/2"	2 3/4"

THE HANCOCK STEM GUIDED INTERMEDIATE OR LINE
CHECK VALVE

Parts



List of Parts

Part Names

Cap	Valve	Coupling Nut
Nipple, Threaded or Brazing		Regrinding Plug

When ordering parts specify part name, also size and figure number of check valve for which wanted

THE HANCOCK SWING INTERMEDIATE OR LINE CHECK VALVE



Fig. 5A.



Fig. 5



Fig. 6

To be attached directly to the delivery end of the Inspirator or located close to it in the delivery line.

Size Numbers and Pipe Connections

Size	Description	PIPE CONNECTIONS			
		Inlet		Outlet	
		Iron	Copper	Iron	Copper
2	Female Inlet and Outlet..... Fig. 5a	1"	.....	1"	.....
3		1 1/4"	.....	1 1/4"	.....
4		1 1/2"	.....	1 1/2"	.....
5		2"	.....	2"	.....
6		2 1/2"	.....	2 1/2"	.....
2	Female Inlet and Male UnionOut-let..... Fig. 5	1"	.....	1"	1 1/4"
3		1 1/4"	.....	1 1/4"	1 1/2"
4		1 1/2"	.....	1 1/2"	1 3/4"
5		2"	.....	2"	2 or 2 1/4"
6		2 1/2"	.....	2 1/2"	2 3/4"
2	Male Union Inlet and Outlet..... Fig. 6	1"	1 1/4"	1"	1 1/4"
3		1 1/4"	1 1/2"	1 1/4"	1 1/2"
4		1 1/2"	1 3/4"	1 1/2"	1 3/4"
5		2"	2 or 2 1/4"	2"	2 or 2 1/4"
6		2 1/2"	2 3/4"	2 1/2"	2 3/4"

THE HANCOCK SWING INTERMEDIATE OR LINE CHECK VALVE

Parts



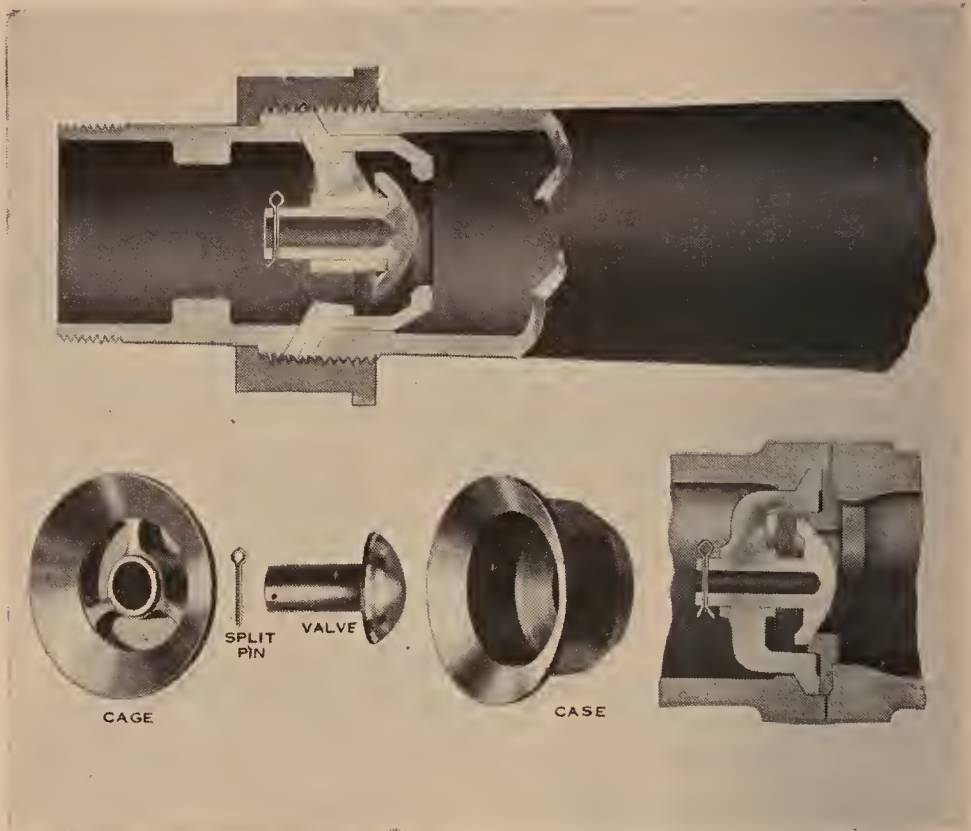
List of Parts

Part Names			
Cap	Disc	Disc Nut	Hinge
Hinge Pin	Coupling Nut	Nipple, Threaded or Brazing	

When ordering parts specify part name also size and figure number of check valve for which wanted.

THE HANCOCK NUMBER III INTERMEDIATE OR LINE CHECK VALVE

Parts



List of Parts

Part Names

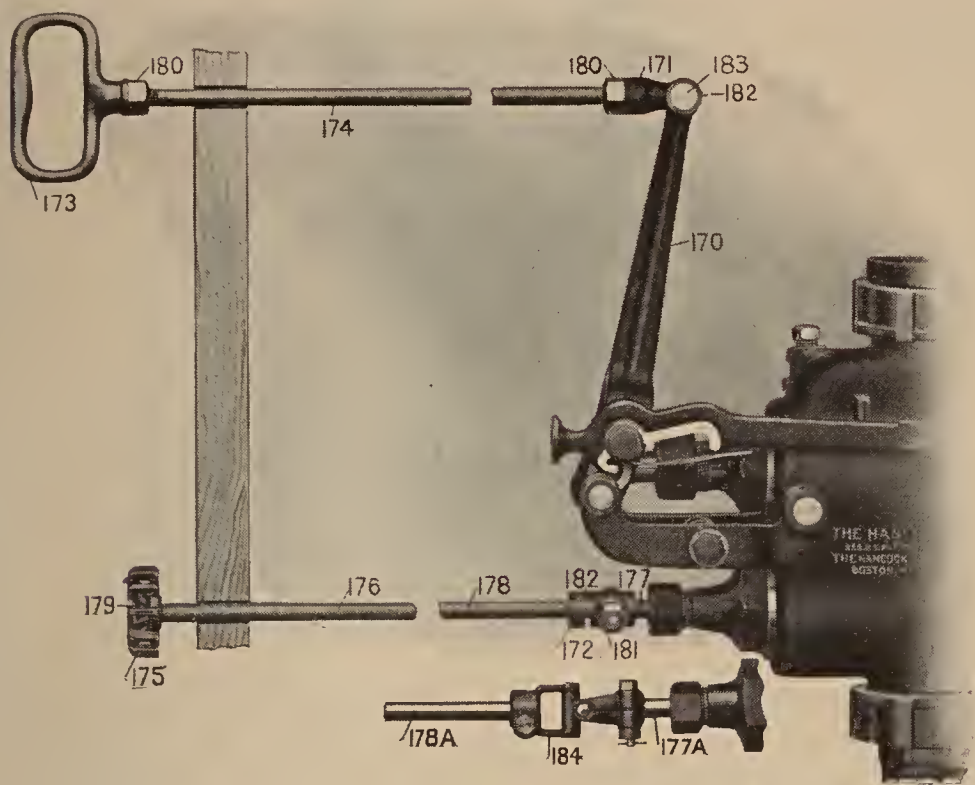
Case Cage Valve (with Pin)

Size Number	Furnished with following Inspirators
3	Type A, Nos. 5 and 6
4	Type A, No. 7; Type B, Nos. 5, 6, and 7
5	Type A, Nos. 8, 9, 9½, 10 and 11; Type B, Nos. 8, 9, 9½, 10 and 11
3	Type Composite, Medium
5	Type Composite, Large
5	Type Composite, Special
	Stem Guided or Swing Check used for Type Composite, Extra

When ordering parts for these checks give name of part and the type and size of Inspirator for which desired.

CAB LEVER EXTENSIONS FOR HANCOCK INSPIRATORS

Types A, B, E, EA, F, G, Composite, H-N-L and L-N-L



The above shows the levers, rods and joints we furnish when it is necessary to place the Inspirators outside of the cab. The rods are in two pieces, each with one end fitted with its attachment and are designed to be welded up to the desired length. Although the joint connecting the rod to the Regulating Spindle is made with a loose fit to provide for alignment, the rod should be set as nearly as possible in line with the spindle, and both rods should be made to work freely in front end of cab. In welding up the rod for the Regulating Spindle, care should be taken to have the pin in Regulating Wheel stand at top when Regulating Valve is wide open. The rod can be twisted to effect this.

List of Parts for Cab Lever Extension

Part No.	Name	Part No.	Name
170	Lever	178-178A	Coupling Rod
171	Lever Joint	179	Nut for Regulating Wheel
172	Coupling for 177-178	180	Check Nut for Handle Rod
173	Pull Handle	181	Bolt and Nut for Regulating Coupling
174	Handle Rod	182	Cotter Pin
175	Regulating Wheel	183	Lever Joint Pin
176	Wheel Rod with Nut	184	Universal Joint for 177A and 178A
177-177A	Regulating Stem and Disc		

THE HANCOCK DETACHABLE COUPLING NUT



This coupling nut was designed for quick and easy removal, whenever the parts become worn or injured, without disturbing the pipe connections. It is especially adapted for use in connection with copper pipes where the collars are brazed on, for if the threads in the coupling become damaged or the grooves for the spanners become distorted, a new Hancock Detachable Coupling Nut can be substituted without disturbing the brazing or jointed ends.

The Hancock Detachable Coupling Nut has been subjected to very severe tests as to its strength, which is equal to the solid coupling nuts of the same size. The collar is made of steel which will not be damaged by the use of a hammer and set. It is made in sizes to fit all types of Hancock Locomotive Inspirators.

In ordering specify by name "The Hancock Detachable Coupling Nut" to distinguish it from the regular couplings, also state size and type of Inspirator and for which connection wanted and whether for iron or copper pipe.

These coupling nuts are threaded to fit Hancock Inspirators, Main Steam Valves or Boiler Check Valves.

Size	SUITABLE FOR NIPPLES	
	Iron Pipe Size	Brazing for Outside Diameter Copper
1	.....	1"
2	1"	1 1/8"
3	1 1/4"	1 1/2"
4	1 1/2"	1 3/4"
5	2"	2 1/4"
6	2 1/2"	2 3/4"
7	3"	3 1/4"

THE HANCOCK NON-LIFTING INSPIRATOR

Types H-N-L and L-N-L

Description

These types consist of a body, to be attached in an upright position, containing two sets of tubes the same as in lifting Inspirators, but modified to meet non-lifting conditions.

These Inspirators are also provided, on the suction side, with an annunciating or alarm valve which works automatically, is heavy enough to overcome the pressure of water in the tank and is piped to the gage cock drip funnel or a separate funnel, as may be desired, under the eye of the engineer, so that if the Inspirator breaks this pipe discharges steam or water in full view of the engineer. This valve is also provided with an opening so that any water left in the pipe will drain out to prevent freezing. The drip opening is closed when the valve is open.

These Inspirators are also provided with a check valve in the suction end to prevent blowing off the hose should the Inspirator "break" and to ensure the opening of the annunciator valve. This check valve is provided with an opening through it sufficiently large to use as a heater.

The lifting side of the Inspirator is provided with a separate steam pipe connecting with the main steam pipe at the operating valve. This pipe at the operating valve is provided with a regulating valve for regulating the supply of water from maximum to minimum, the same as the regulating valve in lifting Inspirators.

Operating Valve

The Operating Valve is controlled by one lever. Attached to this valve are two pipes, one supplying steam to the forcer tubes, the other supplying steam to the lifting tubes.

Mounted on the operating valve is a regulating valve for controlling the volume of steam to the lifting tubes for regulating the capacity and for heating tank water. This valve is operated in the same manner as the regulating valve on lifting Inspirators, see page 9.

Overflow Valve

The overflow valve is operated by means of a handle attached to a rod. This rod passes down through a stand on the running board in front of the engineer, and is equipped with proper joints to connect with the overflow valve. This is the only operative valve directly attached to the Inspirator;

THE HANCOCK NON-LIFTING INSPIRATOR

Types H-N-L and L-N-L

(Continued)

it is always kept closed except when starting the Inspirator, and as this valve closes positively with a screw, there is no opportunity for water to escape or waste when the Inspirator is working, or when shut off. The only escape of water being while starting. This valve is closed by turning the handle to the right.

Operation

To start the Inspirator under normal conditions, the regulating valve being well open, the final overflow valve should be opened by turning the handle about half a turn to the left (but when the Inspirator is required to lift or dislodge hot water from the suction pipe the overflow valve should be opened to the fullest extent.) Draw back the lever of the operating valve into the lifting or priming position, the same as for a lifting Inspirator, then draw the lever back as far as it will go and close the final overflow valve, whereupon the Inspirator will be in full operation. By means of the regulating valve the capacity of the Inspirator may be reduced to about thirty-three per cent. of its maximum. After very little practice it will be found that the drawing back of the operating valve lever and the closing of the final overflow valve may be performed almost simultaneously. Should the Inspirator break or fail to work the fact will be indicated by the blowing of steam from the alarm pipe.

To stop the Inspirator, shut off the operating valve, always leaving the overflow closed. The overflow valve should remain closed until the Inspirator is to be started again.

To Use as a Heater

With overflow valve closed, shut the regulating valve tightly and pull operating handle to priming position. Then open regulating valve until required amount of steam is obtained.

Repairing

Examine the steam nozzles and tubes, inserting new parts where necessary, being careful to see that all nozzles and tubes also capacity plate bear the same capacity number.

If the seats for the operating valves and auxiliary disc are found scored or cut, reseal them with tools shown on pages 22-23, removing as little metal as necessary to make a good seat.

Grind all valves to their seats and assemble. See that there is a strainer in both the top and bottom of the alarm valve body to prevent the entrance of dirt also that the alarm valve when replaced is put back right side up.

THE HANCOCK NON-LIFTING INSPIRATOR

Types H-N-L and L-N-L

(Continued)

Liming Out the Non-Lifter

To lime out the Non-Lifting Inspirator remove the cap No. 1016 above the intermediate overflow valve and the plug No. 641 underneath the lifter tube, leaving the intermediate overflow valve No. 1017 on its seat. Pour acid solution (1 part muriatic acid, 10 parts water) in on top of the intermediate overflow valve untill it ceases to react and clear solution appears at the plug opening underneath the lifter tube, indicating that the lime has been removed. Next open the final overflow valve No. 1022 to draw off the acid and wash out the remaining acid by pouring water on top of the intermediate overflow valve, first closing the final overflow valve No. 1022. If the engine is under steam, replace the cap and plug and wash out the Inspirator by priming.

Application

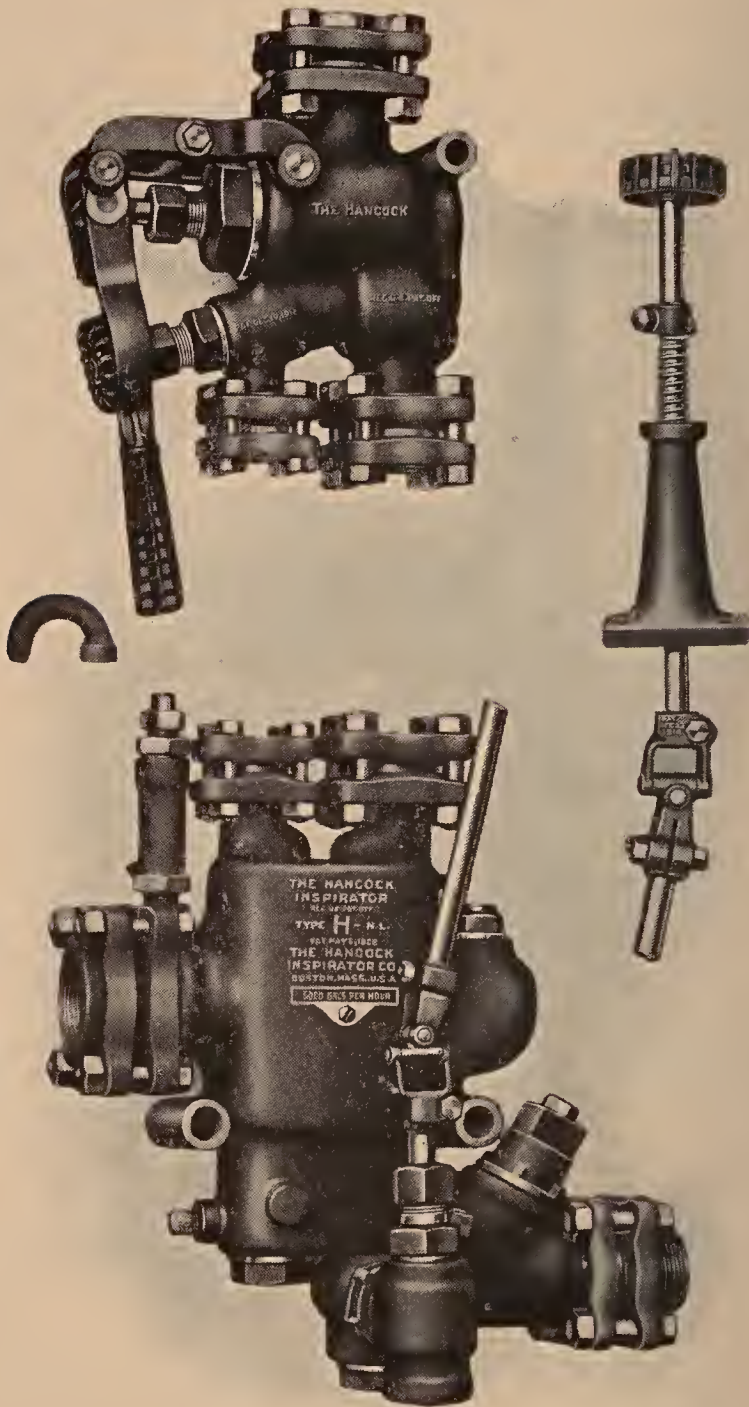
The operating valve and overflow handle should be located in the cab, convenient for operation by the engineer.

The Inspirator body should be fastened to the frame of the engine by means of a substantial bracket extending out from the frame, and located under the cab below the level of the bottom of the tank, if possible. The copper pipes connecting the operating valve in the cab with the Inspirator body should never be straight, but should contain an "S" bend to allow for expansion and contraction in both the pipes and between the boiler and the frame. The alarm pipe can be either of iron or copper and the alarm nozzle should be located sufficiently above the gauge cock drip funnel or a special drip pipe provided for the purpose, to enable the engineer to see the discharge.

The Hose Strainer should be securely fastened by a substantial bracket and coupled to the Inspirator so as to avoid all quarter turns or bends in the suction pipe.

THE HANCOCK INSPIRATOR

Type H-N-L



The H-N-L is made in one standard body only. Furnished in seven capacities of from 2500 to 5500 gallons per hour by the insertion of different interchangeable sets of tubes.

THE HANCOCK INSPIRATOR

Type H-N-L

The Hancock Inspirator, Type H-N-L, is a Non-Lifting Inspirator, having the same double tube and positively closed overflow construction as the lifting types.

It works without change of tubes or adjustment at all steam pressures from 30 to 350 pounds. Minimum capacity at 200 pounds pressure, 33 per cent. of maximum given.

TUBES AND CAPACITIES.—The Type H-N-L is furnished with any of the following sets of tubes and nozzles:

Number 2500 H-N-L, maximum capacity, 2500 gallons per hour

"	3000 H-N-L,	"	"	3000	"	"	"
"	3500 H-N-L,	"	"	3500	"	"	"
"	4000 H-N-L,	"	"	4000	"	"	"
"	4500 H-N-L,	"	"	4500	"	"	"
"	5000 H-N-L,	"	"	5000	"	"	"
"	5500 H-N-L,	"	"	5500	"	"	"

PIPE CONNECTIONS.—All Type H-N-L Inspirators have the following standard connections:

		Copper Outside Diameter	Iron Standard Pipe Size
Steam	To Operating Valve from Boiler.....	2¼"	2"
	From Operating Valve to Inspirator Main Line..	2"	Copper Pipe Only
	From Operating Valve to Inspirator Regulating Line.....	1¼"	" " "
Suction.....		Iron Pipe Only	2½"
Delivery.....		2¼"	2"
Overflow.....		Iron Pipe Only	1¼"
Alarm Line.....		½"	⅜"

DIRECTIONS FOR ORDERING.—State type of Inspirator, size number of tubes (see table above) and whether the connections are to be for iron or copper pipe.

Unless otherwise specified, threaded nipples for iron pipe will be furnished for delivery and overflow connections.

The two steam lines between the operating valve and Inspirator must always be copper and nipples are so furnished.

For outside cab connections, see page 51.

SIZE OF FITTINGS

No. 6 Hancock Main Steam Valve.

No. 6 Hancock Boiler Check Valve.

No. 6 Hancock Hose Strainer.

Suction Hose not less than 3 inch inside diameter.

Larger sizes of valves and suction hose may be used, but they should never be smaller than above.

Type H-N-L



LIST OF PARTS FOR THE HANCOCK INSPIRATOR

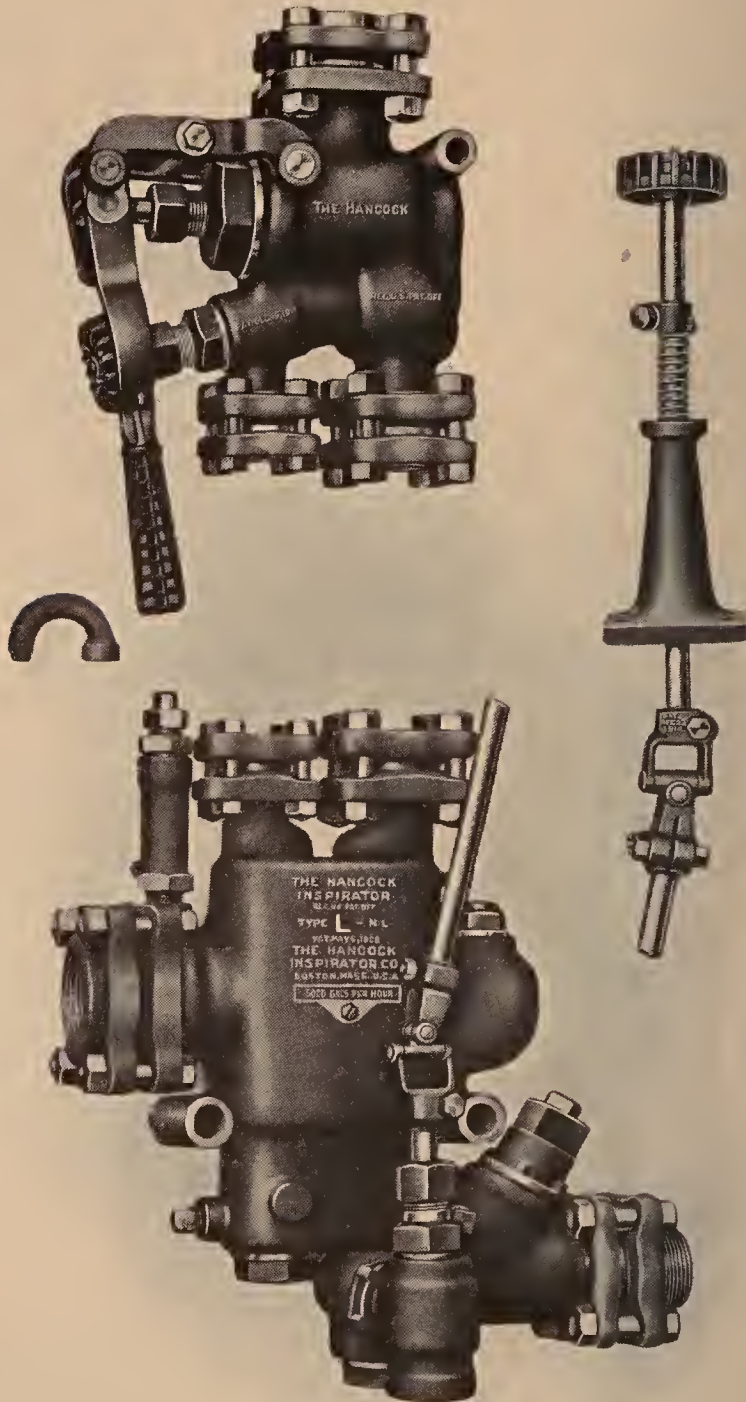
Type H-N-L

Part No.	Name	Part No.	Name
Inspirator Parts			
91	Check Valve Disc	1029	Threaded Flange, Delivery
601	Lifter Nozzle	1030A	Overflow Wheel Rod
602	Lifter Tube	1031	Alarm Valve Nozzle, Brazing
603	Forcer Nozzle	1032	Alarm Valve Brazing Nipple
604	Forcer Tube	1034	Threaded Flange, Regulating Line Connection
612	Brazing Nipple, Forcer Steam	1035	Threaded Flange, Forcer Steam Connection
614	Companion Flange, Delivery	1036	Capacity Plate
617	Overflow Valve Stem	1037	Capacity Plate Screw
619	Overflow Packing Nut	1041	Extension Rod Collar Spring
621	Overflow Disc Nut	1043	Delivery Drain Plug
623	Overflow Valve Plug	1044	Extension Rod Collar Screw
626	Extension Rod Collar	1056	Relief Plug
629	Overflow Wheel Nut	Operating Valve Parts	
633	Overflow Wheel	606	Steam Valve Seat, Operating Valve
641	Lifter and Forcer Tube Cap	612	Brazing Nipple, Forcer Steam
642	Delivery Flange Bolt Nut	614	Flange, Main Steam
650	Overflow Extension Rod	627	Regulating Packing Nut
651	Universal Joint, Complete	629	Regulating Wheel Nut
652	Running Board Stand	633	Regulating Wheel
655	Alarm Valve Disc	642	Steam Flange Bolt Nut
656	Alarm Valve Body	664	Companion Flange, Regulating Line
657	Alarm Valve Bonnet	665	Brazing Nipple, Regulating Line
658	Alarm Valve Nozzle, Threaded	673	Brazing Nipple, Main Steam
660	Suction Valve	676	Companion Flange, Forcer Steam.
661	Suction Flange Bolt	677	Forcer Steam Flange Bolt
662	Suction Flange Bolt Nut	678	Main Steam Flange Bolt
664	Companion Flange, Regulating Line	679	Regulating Line Flange Bolt
665	Brazing Nipple, Regulating Line	681	Forcer Steam Flange Bolt Nut
667	Alarm Valve Coupling Nut	682	Regulating Line Flange Bolt Nut.
669	Alarm Valve Nipple, Threaded	685	Operating Valve Packing Nut
673	Brazing Nipple, Delivery	688	Operating Valve Disc Nut
674	Threaded Nipple, Delivery	1001	Regulating Bonnet
676	Companion Flange, Forcer Steam.	1004	Side Strap, Upright Lever, R. H.
677	Forcer Steam Flange Bolt	1005	Side Strap, Upright Lever, L. H.
678	Delivery Flange Bolt	1006	Operating Valve Bonnet
679	Regulating Line Flange Bolt	1007	Operating Valve
681	Forcer Steam Flange Bolt Nut	1008	Operating Valve Auxiliary Disc
682	Regulating Line Flange Bolt Nut.	1009	Operating Valve Stem
1015	Companion Flange, Suction	1010	Upright Lever
1016	Intermediate Overflow Bonnet	1011	Lever Pin
1017	Intermediate Overflow Valve	1012	Side Strap Bolt
1018	Overflow Valve Body	1013	Side Strap Bolt Nut
1019	Overflow Valve Coupling	1014	Regulating Valve Seat
1020	Overflow Valve Nipple	1033	Inverted Lever
1021	Overflow Valve Bonnet	1034	Threaded Flange, Regulating Line
1022	Overflow Valve Disc	1035	Threaded Flange, Forcer Steam
1023	Overflow Valve Seat	1057	Regulating Valve Stem with Nut
1025	Check Valve Regrinding Plug	1058	Side Strap, Inverted Lever, R. H
1027	Stem Guided Check Valve Cap.	1059	Side Strap, Inverted Lever, L. H
1028	Check Valve Hinge Pin and Head		

Tube Wrenches, see pages 20-21.

Reseating Tools, see pages 22-23.

THE HANCOCK INSPIRATOR Type L-N-L



The Hancock Non-Lifting Inspirator, Type L-N-L is made in one standard body size, adapted to five capacities of from 5500 to 7500 gallons per hour by the insertion of different interchangeable sets of tubes.

THE HANCOCK INSPIRATOR

Type L-N-L

The Hancock Inspirator, type L-N-L, is a non-lifting Inspirator, having the same double tube and positively closed overflow construction as the lifting types.

It works without change of tubes or adjustment at all steam pressures from 30 to 350 pounds.

Minimum capacity at 200 pounds pressure, 33 per cent. of maximum given.

Tubes and Capacities. Type L-N-L is furnished with any of the following sets of tubes and nozzles:

Number 5500-L-N-L, Maximum Capacity 5500 gallons per hour.

"	6000-L-N-L,	"	"	6000	"	"	"
"	6500-L-N-L,	"	"	6500	"	"	"
"	7000-L-N-L,	"	"	7000	"	"	"
"	7500-L-N-L,	"	"	7500	"	"	"

Pipe Connections. All type L-N-L Inspirators have the following standard connections:

		Copper Outside Diameter	Iron Standard Pipe Size
Steam	To Operating Valve from Boiler.....	2 $\frac{3}{4}$ "	2 $\frac{1}{2}$ "
	From Operating Valve to Inspirator Main Line..	2"	Copper Pipe only
	From Operating Valve to Inspirator Regulating Line.....	1 $\frac{1}{4}$ "	" " "
Suction.....		Iron Pipe Only	3"
Delivery.....		2 $\frac{3}{4}$ "	2 $\frac{1}{2}$ "
Overflow.....		Iron Pipe Only	1 $\frac{1}{2}$ "
Annunciator Line.....		1 $\frac{1}{2}$ "	$\frac{3}{8}$ "

Directions for Ordering. State type of Inspirator, size number of tubes (see table above) and whether the connections are to be for iron or copper pipe.

Unless otherwise specified, threaded nipples for iron pipe will be furnished for delivery and overflow connections.

The two steam lines between the operating valve and Inspirator must always be copper and nipples are so furnished.

For outside cab connections see page 51.

SIZE OF FITTINGS

No. 7 Hancock Main Steam Valve.

No. 7 Hancock Boiler Check Valve.

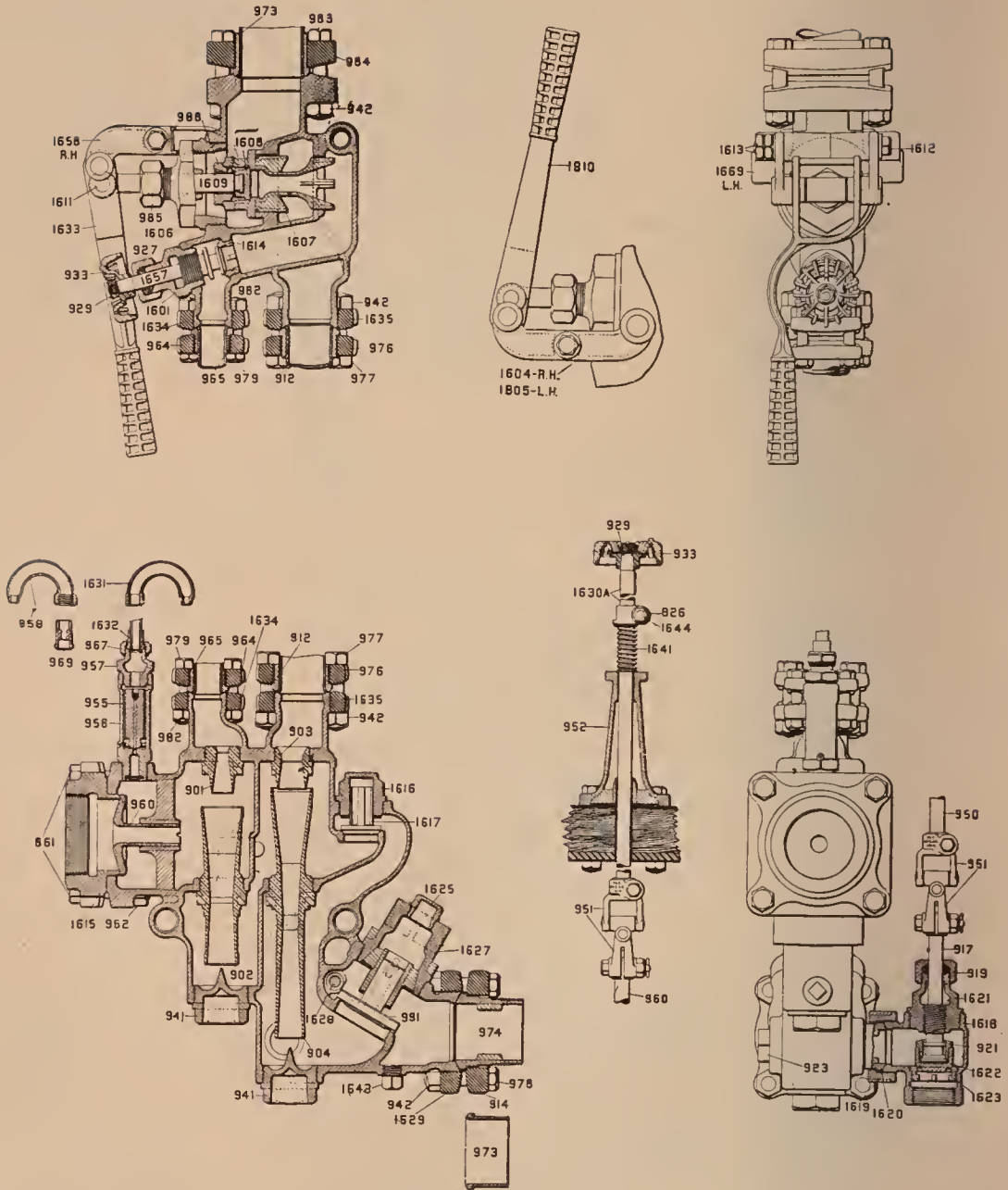
No. 7 Hancock Hose Strainer.

Suction Hose not less than 3 $\frac{1}{2}$ inch inside diameter.

Larger sizes of valves and suction hose may be used, but they should never be smaller than above.

THE HANCOCK INSPIRATOR

Type L-N-L



When ordering repair parts, use both number and name given on opposite page; also give type of the Inspirator for which they are required.

In addition, when ordering tubes or nozzles, the capacity number (see preceding page) must be stated.

NOTE.—Each tube and nozzle has its capacity either stamped or cast upon it. It is absolutely essential that each of these four parts (Nos. 901, 902, 903 and 904), also capacity plate (No. 1636) as applied to an Inspirator, bear the same capacity number.

LIST OF PARTS FOR THE HANCOCK INSPIRATOR

Type L-N-L

Part No.	Name	Part No.	Name
Inspirator Parts		1629	Threaded Flange, Delivery
901	Lifter Nozzle	1630A	Overflow Wheel Rod
902	Lifter Tube	1631	Alarm Nozzle, Brazing
903	Forcer Nozzle	1632	Alarm Valve Brazing Nipple
904	Forcer Tube	1634	Threaded Flange, Regulating Line Connection
912	Brazing Nipple, Forcer Steam	1635	Threaded Flange, Forcer Steam Connection
914	Companion Flange, Delivery	1636	Capacity Plate
917	Overflow Valve Stem	1637	Capacity Plate Screw
919	Overflow Packing Nut	1641	Extension Rod Collar Spring
921	Overflow Disc Nut	1643	Delivery Drain Plug
923	Overflow Valve Plug	1644	Extension Rod Collar Screw
926	Extension Rod Collar	1656	Relief Plug
929	Overflow Wheel Nut	Operating Valve Parts	
933	Overflow Wheel	906	Steam Valve Seat, Operating Valve
941	Lifter and Forcer Tube Cap	912	Brazing Nipple, Forcer Steam
942	Delivery Flange Bolt Nut	914	Flange, Main Steam
950	Overflow Extension Rod	927	Regulating Packing Nut
951	Universal Joint Complete	929	Regulating Wheel Nut
952	Running Board Stand	933	Regulating Wheel
955	Alarm Valve Disc	942	Steam Flange Bolt Nut
956	Alarm Valve Body	964	Companion Flange, Regulating Line
957	Alarm Valve Bonnet	965	Brazing Nipple, Regulating Line
958	Alarm Valve Nozzle, Threaded	973	Brazing Nipple, Main Steam
960	Suction Valve	976	Companion Flange, Forcer Steam
961	Suction Flange Bolt	977	Forcer Steam Flange Bolt
962	Suction Flange Bolt Nut	978	Main Steam Flange Bolt
964	Companion Flange, Regulating Line	979	Regulating Line Flange Bolt
965	Brazing Nipple, Regulating Line	981	Forcer Steam Flange Bolt Nut
967	Alarm Valve Coupling Nut	982	Regulating Line Flange Bolt Nut.
969	Alarm Valve Nipple, Threaded	985	Operating Valve Packing Nut
973	Brazing Nipple, Delivery	988	Operating Valve Disc Nut
974	Threaded Nipple, Delivery	1601	Regulating Bonnet
976	Companion Flange, Forcer Steam.	1604	Side Strap, Upright Lever, R. H.
977	Forcer Steam Flange Bolt	1605	Side Strap, Upright Lever, L. H.
978	Delivery Flange Bolt	1606	Operating Valve Bonnet
979	Regulating Line Flange Bolt	1607	Operating Valve
981	Forcer Steam Flange Bolt Nut	1608	Operating Valve Auxiliary Disc
982	Regulating Line Flange Bolt Nut.	1609	Operating Valve Stem
991	Check Valve Disc	1610	Upright Lever
1615	Companion Flange, Suction	1611	Lever Pin
1616	Intermediate Overflow Bonnet	1612	Side Strap Bolt
1617	Intermediate Overflow Valve	1613	Side Strap Bolt Nut
1618	Overflow Valve Body	1614	Regulating Valve Seat
1619	Overflow Valve Coupling	1633	Inverted Lever
1620	Overflow Valve Nipple	1634	Threaded Flange, Regulating Line
1621	Overflow Valve Bonnet	1635	Threaded Flange, Forcer Steam
1622	Overflow Valve Disc	1657	Regulating Valve Stem with Nut
1623	Overflow Valve Seat	1658	Side Strap, Inverted Lever, R. H.
1625	Check Valve Regrinding Plug	1659	Side Strap, Inverted Lever, L. H.
1627	Stem Guided Check Valve Cap.		
1628	Check Valve Hinge Pin and Head		

Tube Wrenches, see pages 20-21.

Reseating Tools, see pages 22-23.

THE HANCOCK NON-LIFTING INSPIRATOR

Type M-N-L

Application

This Inspirator should be located under the Cab at a level below bottom of tank and attached to a sufficiently rigid bracket to prevent vibration. Two valves, the Suction Valve and Overflow Valve require extension rods and their Running Board Stand (No. 2395), should be located conveniently for operating, usually in front and close to the Engineer's or Fireman's seat.

Operating Lever

The Operating Lever should be attached to either the back head, the side of the boiler, or, in extreme cases, on the side of the steel cab by means of a heavy bracket. This lever should be so placed as to be within easy reach of the engineer's hand and yet should be so located as to give easy access to other cab fittings. A $\frac{3}{4}$ " iron pipe connects this lever with the Inspirator, by means of which the latter is operated. An adjustment is provided to take care of the wear of parts, due to regrinding, etc., and to maintain the travel of the lever.

Connections

The connecting pipes and fittings should all have sectional areas at least equal to those listed on page 67 under the heading, Pipe Connections.

Pipe Connections and Size of Fittings

Steam. Steam should be taken from a point where it will be obtained dry and at full pressure under all conditions. We strongly recommend that the main steam valve to the Inspirator be screwed or flanged directly to the boiler shell or backhead and connected inside by a full sized independent dry pipe to the steam dome and located at some distance from the main dry pipe. The main steam valve to the Inspirator should be of the angle rather than globe type wherever possible as an angle valve offers less resistance to the flow of steam.

All non-lifting Inspirators are furnished with flanged connections and may be used with nipples brazed to copper pipes or the copper pipe may be flanged over the nipple.

The pipe leading from the main steam valve to the Inspirator should in all cases be of copper and at least of the size designated.

Suction. The tank valve should have sectional areas considerably in excess of the full hose area specified even after reasonable wear of the pins and rods in its connections. The total area through the holes of the strainer (either in the tank well or hose line) should be at least double the pipe area specified for the suction connections.

The suction connection of all type M-N-L non-lifting Inspirators is furnished with threaded nipple for iron pipe. Any desired length of pipe may be used to connect with strainer which is also tapped to size corresponding with the nipple on the Inspirator.

THE HANCOCK NON-LIFTING INSPIRATOR

Type M-N-L

Operation

A sectional line cut showing the internal construction of this Inspirator will be found on page 68.

Starting and Shutting off. To start the Inspirator, open the overflow valve, make sure suction valve is open, pull lever back two to three notches or until the water is coming freely from the overflow, then pull the lever back to full stroke and close overflow. To stop Inspirator, push lever forward to full end of stroke and drop the latch. Be sure lever is pushed forward to full end of stroke before dropping the latch, otherwise the forcer valve will not be seated, causing the seats to rapidly develop leaks.

Opening the suction and overflow valves (Nos. 2238 and 2249) by means of handles, allows the water to flow freely through the tubes which is necessary before steam is applied. A slight movement of the lever admits a small quantity of steam to the lifter steam nozzle (No. 2201) and starts circulation of the water. A further movement of the lever, drawing it back as far as it will go, fully opens the forcer steam valve, admitting the full quantity of steam to both steam nozzles.

Regulation

For full capacity of the Inspirator, open the suction valve by means of the regulating wheel in cab to its full opening. Any desired quantity of water within the range of the Inspirator can be obtained by adjusting this valve. To reduce the capacity, turn valve handle to the right.

To Use as a Heater

To use the Inspirator as a heater see that overflow is closed and suction valve open, then pull operating lever back two or three notches. This will allow sufficient steam to pass through the hose to heat the water. Care should be taken not to pull lever open enough to lift alarm valve and allow steam to escape through pipe into cab.

Maintenance and Repairs

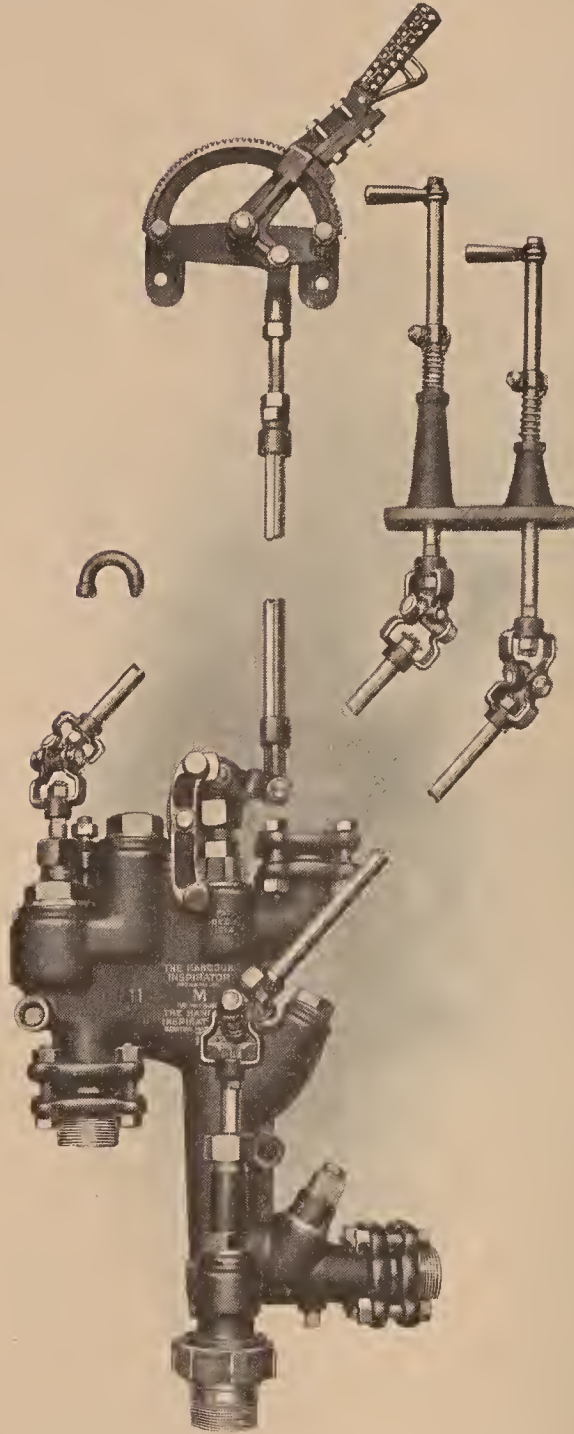
All valve seats in these Inspirators should be refaced by using proper tools made for the purpose, see pages 22-23 and then reground in the same manner as is practiced with ordinary globe and angle valves.

Tubes and Nozzles

These may be removed or inserted with wrenches as shown on pages 20-21.

In changing the tubes and nozzles from one capacity to another, all four must be changed. Each has its capacity either stamped or cast upon it and it is absolutely essential that each of these four parts, (Nos. 2201, 2202, 2203 and 2204) also the capacity plate, (No. 2336) as applied to an Inspirator, bears the same capacity number. Instructions for applying and repairing Forcer Steam Valves will be found on pages 14 and 15.

THE HANCOCK INSPIRATOR Type M-N-L



The Hancock Non-Lifting Inspirator Type M-N-L is made in two different body sizes.

No. 11 is adapted to six capacities of from 3000 to 5500 gallons per hour, by the insertion of different interchangeable sets of tubes and nozzles.

No. 13 is adapted to six capacities of from 5000 to 7500 gallons per hour by the insertion of different interchangeable sets of tubes and nozzles.

All repairs to this Inspirator can be made without the necessity of disconnecting any pipe joints.

THE HANCOCK INSPIRATOR

Type M-N-L

The Hancock Inspirator, type M-N-L, is a non-lifting Inspirator, having the same double tube and positively closed overflow construction as the lifting types.

This type of Inspirator was designed especially for the U. S. Railroad Administration and was applied to many of the "Administration" locomotives.

It works without change of tubes or adjustment from 30 to 350 pounds.

Minimum capacity at 200 pounds pressure 50 per cent of maximum given.

Tubes and Capacities. Type M-N-L is furnished with any of the following sets of tubes and nozzles:

Number 11				Number 13			
3000-M-N-L, max. cap.	3000	gal.	per hour	5000-M-N-L, max. cap.	5000	gal.	per hour
3500-M-N-L, " "	3500	"	"	5500-M-N-L, " "	5500	"	"
4000-M-N-L, " "	4000	"	"	6000-M-N-L, " "	6000	"	"
4500-M-N-L, " "	4500	"	"	6500-M-N-L, " "	6500	"	"
5000-M-N-L, " "	5000	"	"	7000-M-N-L, " "	7000	"	"
5500-M-N-L, " "	5500	"	"	7500-M-N-L, " "	7500	"	"

Pipe Connections. All type M-N-L Inspirators have the following standard connections:

Size	Steam and Delivery		Suction	Overflow
	Iron	Copper	Iron	Iron
No. 11.....	2"	2 $\frac{1}{4}$ "	2 $\frac{1}{2}$ "	2 $\frac{1}{2}$ "
No. 13.....	2 $\frac{1}{2}$ "	2 $\frac{3}{4}$ "	3"	3"

Directions for Ordering. State size and type of Inspirator, size number of tubes (see table above) and whether the Steam and delivery connections are to be for iron or copper pipe.

Unless otherwise specified we furnish, for steam connection, Brazing Nipple for copper pipe; for suction, delivery and overflow connections, Threaded Nipples for iron pipe.

For general description, operation, in structions for applying and repairing, see pages 64 and 65.

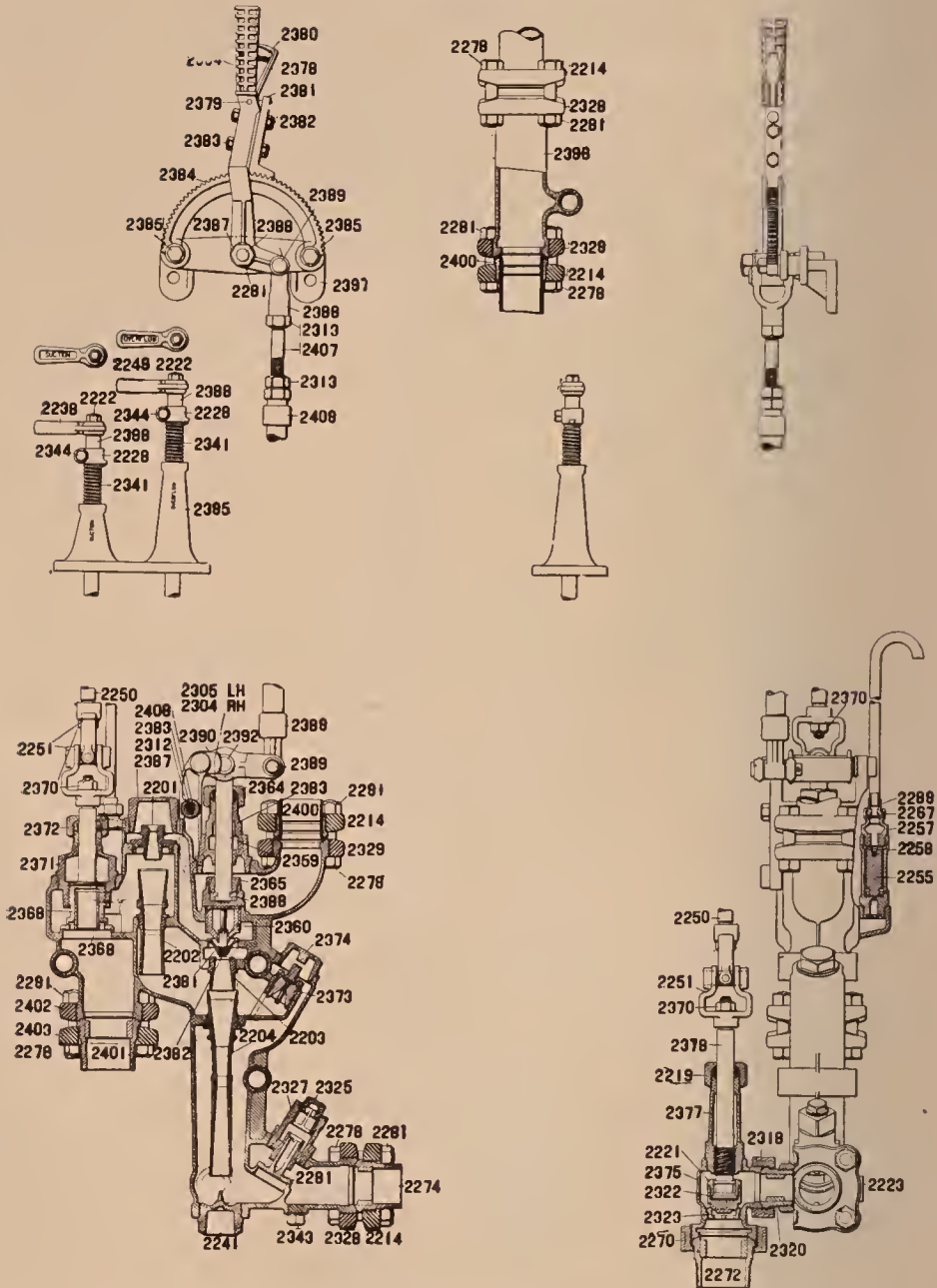
Size of Fittings

Size of Hancock Inspirator Type M-N-L	Hancock Main Steam Valves		Hancock Boiler Check Valves		Hancock Locomotive Hose Strainers		Smallest Size of Suction Hose to be Used
	No.	Size	No.	Size	No.	Size	
11	6	2"	6	2"	6	2 $\frac{1}{2}$ "	3"
13	7	2 $\frac{1}{2}$ "	7	2 $\frac{1}{2}$ "	7	3"	3 $\frac{1}{2}$ "

Larger sizes of valves and suction hose may be used, but they should never be smaller than above.

THE HANCOCK INSPIRATOR

Type M-N-L



When ordering repair parts, use both number and name given on opposite page; also give size and type of the Inspirator for which they are required.

In addition, when ordering tubes or nozzles, the capacity number (see preceding page) must be stated.

NOTE.—Each tube and nozzle has its capacity number either stamped or cast upon it. It is absolutely essential that each of these four parts (Nos. 2201, 2202, 2203 and 2204) also capacity plate (No. 2336), as applied to an Inspirator, bear the same capacity number.

LIST OF PARTS FOR THE HANCOCK INSPIRATOR

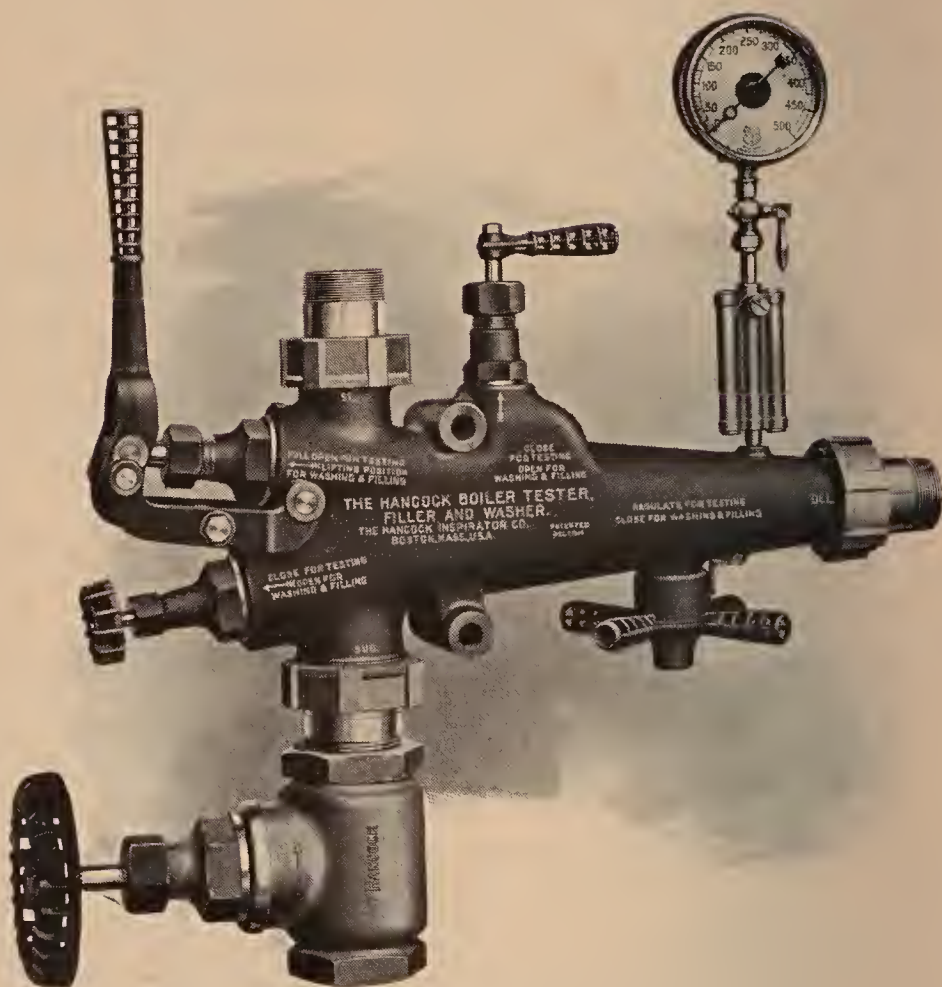
Type M-N-L

Part No.	Name	Part No.	Name
2201	Lifter Nozzle	2360	Steam Valve
2202	Lifter Tube	2363	Steam Bonnet
2203	Forcer Nozzle	2364	Steam Packing Nut
2204	Forcer Tube	2365	Steam Valve Coupling Nut
2214	Companion Flange, Steam and Del.	2366	Steam Valve Clamp Ring
2219	Final Overflow Packing Nut	2367	Lifter End Cap
2221	Final Overflow Disc Nut	2368	Suction Valve
2222	Upper Extension Rod Nut	2369	Suction Valve Stem
2223	Overflow Plug	2370	Nut for Parts 2250, 2369 and 2376
2226	Extension Rod Collar	2371	Suction Bonnet
2238	Suction Handle	2372	Suction Packing Nut
2241	Forcer Tube Cap	2373	Intermediate Overflow Valve
2249	Overflow Handle	2374	Intermediate Overflow Cap
2250	Extension Rod, Lower	2375	Final Overflow Body
2251	Universal Joint, Complete	2376	Final Overflow Stem
2255	Annunciator Valve	2377	Final Overflow Bonnet
2256	Annunciator Valve Body	2378	Operating Lever Trigger
2257	Annunciator Valve Bonnet	2379	Trigger Pin
2267	Annun. Valve Coupling Nut	2380	Trigger Spring
2268	Annun. Valve Brazing Nipple	2381	Operating Lever Latch
2269	Annun. Valve Threaded Nipple	2382	Latch Bolt
2270	Coupling Nut, Overflow Outlet	2383	Latch Bolt Nut
2272	Threaded Nipple, Overflow Outlet	2384	Quadrant
2274	Threaded Nipple, Delivery	2385	Quadrant Cap Screw
2278	Flange Bolt, Steam, Suc. and Del.	2386	Operating Lever Stud
2281	Nut for Parts 2386 and 2278	2387	Operating Lever Stud Washer
2291	Delivery Stem Guided Check Valve	2388	Operating Crank Eye
2304	Side Strap, R. H	2389	Pin for Parts 2388 and 2398
2305	Side Strap, L. H	2390	Operating Crank
2312	Side Strap Bolt	2392	Operating Crank Pin
2313	Connecting Rod Check Nut	2393	Side Strap Sleeve
2319	Coupling Nut, Overflow Inlet	2394	Operating Lever
2320	Threaded Nipple, Overflow Inlet	2395	Running Board Stand
2322	Final Overflow Disc	2396	Steam Pipe Connection
2323	Final Overflow Seat	2397	Operating Lever Bracket
2325	Check Valve Regrinding Cap	2398	Operating Lever Eye
2327	Del. Stem Guided Check Valve Cap	2399	Extension Rod, Upper
2329	Threaded Flange, Steam and Del.	2400	Pipe Sleeve, Steam
2336	Capacity Plate	2401	Threaded Nipple, Suction
2337	Capacity Plate Screw	2402	Threaded Flange, Suction
2341	Extension Rod Spring	2403	Companion Flange, Suction
2343	Drain Plug	2406	Connecting Rod Coupling
2344	Extension Rod Collar Screw	2407	Connecting Rod
2359	Steam Valve Stem	2409	Side Strap Bolt Nut

Tube Wrenches, see pages 20-21.

Reseating Tools, pages 22-23.

THE HANCOCK BOILER TESTER, FILLER AND WASHER



Pipe Connections

Steam 2" Iron Pipe. Delivery 2" Iron Pipe. Suction 2½" Iron Pipe.

For filling we furnish a 7/8" discharge nozzle for end of delivery hose. For washing we furnish two 21-32" nozzles, one straight and the other 90° angle.

THE HANCOCK BOILER TESTER, FILLER AND WASHER

This is a double tube apparatus combining an ejector which does the filling and washing, with an injector which is capable of producing the pressure necessary for testing a boiler. Instructions for operating are cast on the body and if followed, a novice can successfully and efficiently operate it without difficulty.

Installation

The Hancock Boiler Tester, Filler and Washer should be installed as near the steam supply as possible in order to get a continuous, steady flow of pressure and eliminate condensation.

If the main steam line from the boiler to this apparatus is no larger than 2" inside diameter there must be no open lines between the boiler and tester.

Make pipe connections full size as per specifications on page 70. Pressure gauges connected to the steam line just above the tester and the water line, to part 1163, will aid greatly in securing the correct water pressure as per table on page 71 which is very essential when operating the apparatus as a tester.

Filling and Washing

For this service this apparatus has an extremely large capacity of water per hour, the capacity depending on the water and steam pressure available, and will deliver warm or hot water (see table below) as desired. If the delivery is interrupted by closing the valve at the discharge nozzle for the purpose of changing the nozzle from one opening to another, it will resume operation when the valve is opened without any other adjustment. Care should be taken not to stop the flow of water too long otherwise steam will flow back into the water pipe and overheat the water.

The following table No. 1 gives information in regard to capacity, delivery temperatures and pressures, suction water temperatures and pressures for various operating steam pressures when using the apparatus as a washer.

Table No. 1

1 Operating Steam Press	2 Suction Temp.	3 Delivery Temp.	4 Suction Press.	5 Suc.Head in Ft.	6 Delivery Press.	7 Gals. per Hr.	
80 lbs.	43°	94°	5 lbs.	11.0	53 lbs.	5357	} Washout Nozzle $\frac{21}{32}$ " dia.
100 lbs.	43°	100°	5½ lbs.	12.1	70 lbs.	6147	
120 lbs.	43°	105°	7½ lbs.	16.5	80 lbs.	6496	
140 lbs.	43°	108°	11½ lbs.	25.3	99 lbs.	6688	

Note. The Suction Temperatures are winter temperatures. As the temperature will increase during the summer, this will of necessity increase the delivery temperatures. For every degree added to the suction temperature, the delivery temperature will be increased one degree.

With Steam Pressure at the Boiler Tester shown in Col. 1 and with a Suction Temperature of water shown in Col. 2, a Delivery Temperature is

THE HANCOCK BOILER TESTER, FILLER AND WASHER

(Continued)

obtained as shown in Col. 3. Col. 4 shows the Suction Pressure that should be maintained at the suction end for washing purposes. Its equivalent in suction head in feet is shown in Col. 5. The result will be the delivery or nozzle pressure as shown in Col. 6 and the gallons per hour delivered shown in Col. 7. The information given in this table covers the use of either wash-out nozzle.

Particularly aim to obtain as nearly as possible the Suction pressures as shown in Col. 4. This can be done by the regulating valve in the suction and a gauge should be used to accomplish this purpose.

Table No. 2 with similar columns is given to show the suction pressures and the resultant capacities for filling purposes:

Table No. 2

1 Operating Steam Press.	2 Suction Temp.	3 Delivery Temp.	4 Suction Press.	5 Suc. Head in Ft.	6 Delivery Press.	7 Gals. per Hr.	
80 lbs.	40°	80°	8 lbs.	17.6	20 lbs.	7567	Filling Nozzle 7/8" dia.
100 lbs.	40°	84°	14 lbs.	30.8	26 lbs.	8287	
120 lbs.	40°	88°	16 lbs.	34.2	30 lbs.	8625	
140 lbs.	40°	94°	16½ lbs.	35.3	30 lbs.	8557	

Note. The Suction Temperatures are winter temperatures. As the temperature will increase during the summer this will of necessity increase the delivery temperatures. For every degree added to the suction temperature, the delivery temperature will be increased one degree.

Care should be taken to set regulating valve No. 1108 just tight enough to stop leakage, so that any excess pressure building up in delivery line, while valve at discharge nozzle is closed, will open the regulating valve and permit a discharge at this point. Otherwise, the excess pressure is liable to damage hose.

Testing

For this service the apparatus has a capacity of over 3000 gals. per hour, will deliver water at temperatures up to 280° Fahr., and will apply test pressures of 600 lbs. or more, per square inch, the maximum efficiency of apparatus depending on the steam and water pressures available. See table below.

To Operate as a Tester

Regulate valves as per instructions cast upon the body, care being taken to open wide the regulating valve. Regulate water pressure in water line with throttling valve to suit available steam pressure (see table below) and pull lever No. 1137, gradually into full open position—close regulating valve gradually with handle No. 1110 until desired pressure on test gauge No. 1177 is obtained.

To maintain the desired pressure in water line it will be found necessary to slightly open throttling valve in water line as the handle No. 1137 is pulled into full open position.

THE HANCOCK BOILER TESTER, FILLER AND WASHER (Continued)

Water Pressures Best Adapted for Given Steam Pressures and Maximum Delivery Working Pressures

Steam Pressure	Best Water Pressure to Start and Operate	Maximum Delivery Working Pressure
50 lbs.	1 lb.	190 lbs.
60 "	4 "	210 "
80 "	7 "	295 "
100 "	10 "	355 "
120 "	15 "	410 "
140 "	18 "	490 "
160 "	30 "	510 "
180 "	30 "	590 "
200 "	30 " or more	640 "

Regulation of Water Supply

As the water supply to The Hancock Boiler Tester, Filler and Washer must always be under pressure, it is necessary to provide some means for controlling the water supply. For this purpose we recommend The Hancock Globe Valve.

Care should be taken that the steam pressure used should have the proper water pressure supplied, as shown in the above table.

General

The Hancock Boiler Tester, Filler and Washer is well adapted for use in Round Houses and Repair Shops. If used in a Round House, it may be permanently located near the wash-out pipes and take its water either from an overhead tank or the City mains.

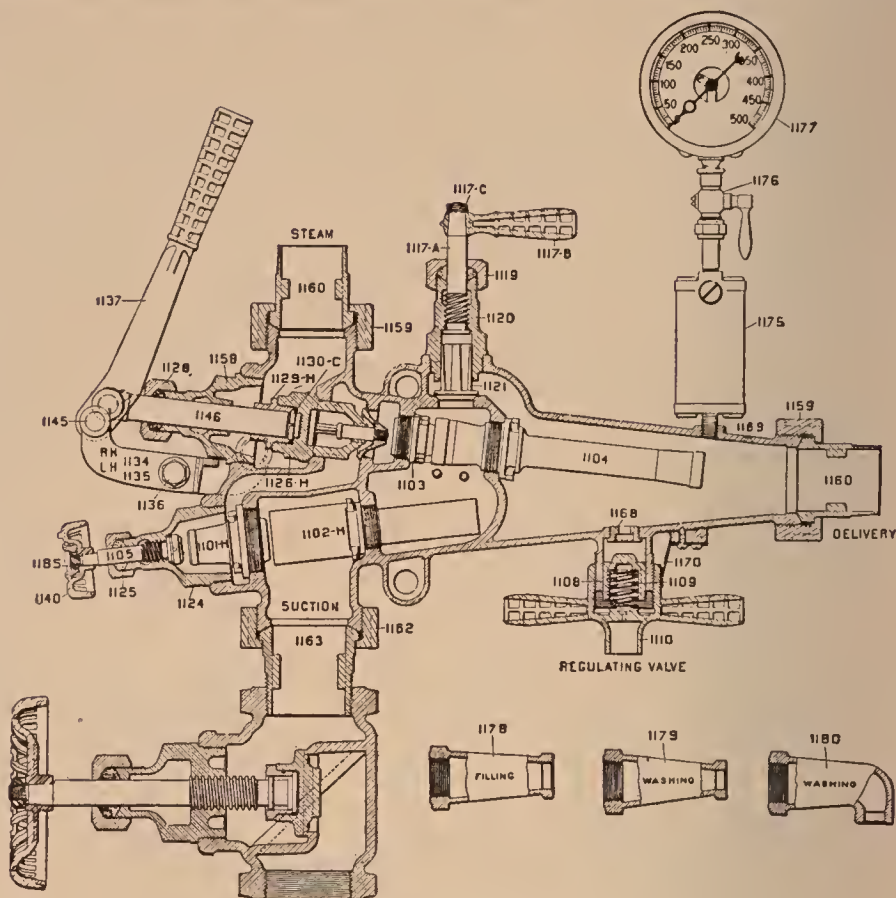
If, when used in a Repair Shop, it is more convenient to have it portable, it can be used that way and will be found equally as efficient as if permanently located.

The choking device interposed between the delivery chamber of the apparatus and the pressure gauge, prevents the momentary and violent fluctuations of pressure from injuring the gauge.

Do not locate this apparatus so far from the source of steam supply that there will be an appreciable reduction in pressure or the steam become badly saturated.

For sectional view and list of parts see page 74.

THE HANCOCK BOILER TESTER, FILLER AND WASHER



List of Parts

Part No.	Name	Part No.	Name
1101	Ejector Steam Nozzle	1135	L. H. Side Strap
1102	Ejector Combining Tube	1136	Side Strap Bolt
1103	Injector Steam Nozzle	1137	Lever
1104	Injector Combining Tube	1140	Secondary Steam Valve Wheel
1105	Secondary Steam Valve Stem	1143	Secondary Steam Valve Wheel Nut
1108	Regulating Valve	1145	Lever Pin
1109	Regulating Valve Spring	1146	Compound Steam Valve Stem
1110	Regulating Valve Handle	1151	Nut for Side Strap Bolt
1117A	Intermediate Valve Stem	1158	Compound Steam Valve Bonnet
1117B	Intermediate Valve Handle	1159	Coupling Nut for Steam and Delivery Conn.
1117C	Intermediate Valve Handle Nut	1160	Threaded Nipple for Steam and Delivery Conn.
1119	Intermediate Valve Packing Nut	1162	Coupling Nut for Suction Conn.
1120	Intermediate Valve Bonnet	1163	Threaded Nipple for Suction Conn.
1121	Intermediate Valve	1168	Regulating Valve Seat
1124	Secondary Steam Valve Bonnet	1170	Spring for 1110
1125	Secondary Steam Valve Packing Nut	1175	Gauge Siphon
1126H	Compound Steam Valve	1176	Gauge Cock
1128J	Compound Steam Valve Packing Nut	1177	Gauge
1129H	Compound Steam Valve Coupling Nut	1178	Filler Nozzle
1130C	Compound Steam Valve Clamp Ring	1179	Washer Nozzle, Straight
1134	R. H. Side Strap	1180	Washer Nozzle, Quarter turn 2" Hancock Globe Valve

CONTENTS

History of The Hancock Inspirator.....	4- 5
--	------

Lifting Inspirators

General Description.....	6- 7
Operation.....	8- 9
Causes of Trouble.....	10-13
Repairing.....	14-18
Dimensions of Coupling Nut Threads.....	19
Tube and Seat Wrenches.....	20-21
Reseating Tools.....	22-23
Type A—Capacities and Connections.....	24-25
Type B—Capacities and Connections.....	26-27
Types A & B—Sectional Cut and List of Parts.....	28-29
Type Composite, Capacities and Connections.....	30-31
Type Composite, Sectional Cut and List of Parts.....	32-33
Types E & EA—Capacities and Connections.....	34-35
Types E & EA—Sectional Cut and List of Parts.....	36-37
Type F—Capacities and Connections.....	38-39
Type F—Sectional Cut and List of Parts.....	40-41
Type G—Capacities and Connections.....	42-43
Type G—Sectional Cut and List of Parts.....	44-45
Stem Guided Line Check Valve and Parts.....	46-47
Swing Line Check Valve and Parts.....	48-49
No. 111 Line Check Valve and Parts.....	50
Cab Lever Extensions.....	51
Detachable Coupling Nut.....	52

Non-Lifting Inspirators

Description.....	53
Operation and Repairs.....	54
Application.....	55
Type H-N-L—Capacities and Connections.....	56-57
Type H-N-L—Sectional Cut and List of Parts.....	58-59
Type L-N-L—Capacities and Connections.....	60-61
Type L-N-L—Sectional Cut and List of Parts.....	62-63
Type M-N-L—Description and Application.....	64
Type M-N-L—Operation and Repairs.....	65
Type M-N-L—Capacities and Connections.....	66-67
Type M-N-L—Sectional Cut and List of Parts.....	68-69
Boiler Tester, Filler and Washer.....	70-74

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